The Chemical Age

A Weekly Journal Devoted to Industrial and Engineering Chemistry

VOL. VII. No. 164 AUGUST 5, 1922 Prepaid Annual Subscription United Kingdom, £1.1.0; Abroad, £1.6.0.

Contents

	PAGE
EDITORIAL NOTES: Practical Man *v.* Professor; The True Role of Vitamins; The Rubber Research Association; French and German Dyes; A Cyclo-hexanol Discovery	161
Notes on the Poisoning of Catalysts. By Alwyn Pickles, M.Sc.	164
Institute of Chemistry Pass Lists	165
Oils from the Spices Aleurites. By J. Hedley Barry	166
Reviews	168
CORRESPONDENCE: "Nitre Pot *v.* Ammonia Converter (L. Carpenter); Analysis of Slaked Lime (E. C. Craven); The Training of Chemists ("China Clay"); "A Good Example" (T. J. M.); "Ninety Years of Science" (T. Macara)	169
Fish By-Products; Anglo-Continental Guano Works	170
Lever Bros.' Co-partnership Developments	171
The Capture of Europe. By Sir Ernest J. P. Benn, Bart.	172
Leeds Chemical Works Explosion; Ramsay Memorial Fellowship	173
Chemical Matters in Parliament	174
From Week to Week	176
References to Current Literature	177
Patent Literature	178
Market Report and Current Prices	181
Scottish Chemical Market	183
German Chemical Trade Notes; The Nitrate Market	184
Company News; Chemical Trade Inquiries; Tariff Changes	185
Commercial Intelligence; New Companies Registered	186

NOTICES:—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

The prepaid subscription to THE CHEMICAL AGE is 21s. per annum for the United Kingdom, and 26s. abroad. Cheques, Money Orders and Postal Orders should be made payable to Benn Brothers, Ltd.

Editorial and General Offices—8, Bouverie St., London, E.C.4.

Telegrams: "Allangas, Fleet, London." Telephone: City 9852 (6 lines).

Practical Man and Professor

THERE is an editorial article in a recent issue of our contemporary the *Engineer* which, though it applies more directly to the science and practice of engineering, might well have been written for the edification of those who gain a livelihood from the manifold ramifications of chemistry. The writer draws attention to the state of affairs which existed as between practical man and professor in the past generation, when practice so frequently gave the lie to theory that the practical man refused to acknowledge the utility of the theorist. Science, however, has now grown so complicated that considerable deference must perforce be shown to the academic mind. In fact, as our contemporary remarks, there is some danger that we shall fall into the opposite extreme, and it is just as important now as ever it was that practical engineers should be close critics of professors and experts. This, no doubt, is a contention with which the professors themselves will be in entire agreement, for they above all must appreciate to the full the considerable difficulties which arise when it comes to translating the experience of the laboratory bench to the works. Many of our important processes have taken years to pass through this period of translation, and when success on a working scale has been achieved—that is to say, when the practical man has applied his mind and hand to the original suggestion—frequently very little remains of the original beyond the basic principle.

By reason of his training there is no doubt that the "works' man" knows intuitively the difference between correct and incorrect design, and it is this practical instinct which is rarely, if ever, found to be combined with the more analytical mind of the professor. There is a growing tendency nowadays for many of the staple technical industries, or the societies and institutions which represent them, to work in concert with an appropriate department of one of the universities—as instance the co-operation between Leeds University and the Institution of Gas Engineers. Such a relation can only result in progress so long as it remains but a relation and does not ultimately resolve itself into a sheer dependence upon the academic worker where the solution of technical problems is concerned. As it is, the professors are now usually the outstanding "turn" at many of our technical meetings, the result being that such meetings have lost a good deal of their former vivacity and enjoyment. As our contemporary points out, the works' representatives are silent in the face of the professor, and discussions, such as they are, upon the work done in universities and laboratories turn usually upon rather unimportant details and miss the great essentials. The flood of knowledge passes over the head of the workaday man who, often enough, is not even conversant with the terminology employed. On the other hand, it does not infrequently happen that the practical man has experience that does not tally with that of the professor, and yet he remains silent because he cannot bring an array of ordered facts and figures to support his views, and he fears to break a lance with the accoutred expert. It has been said that only experts can discuss the work of experts; and unfortunately there is a great deal of truth in the statement.

The True Rôle of Vitamins

IT is a curious reflection that there are fashions in science, just as in hats and gowns. Time was when some chemists, for example, newly read in the ionic theory and the phenomena of solution, sought to explain all reactions in such terms. Then came a period, from which we are only now emerging, when the new knowledge regarding colloids similarly became the means by which hitherto inexplicable occurrences in laboratory or works were correctly solved for the first time. And so to-day in the sphere of food

chemistry it is the 'vitamins," that are in danger of being over-emphasised. In matters scientific no sooner has the pioneer proclaimed his results than hosts of writers—many wholly irresponsible—proceed to spread the news throughout the scientific world. Ultimately the real meaning of the discovery is in many instances obscured and frequently exaggerated. Such unwarranted statements savour of pseudo-scientific quackery; and the fault lies at the door of those irresponsibles who have distorted the work of the pioneers. For these reasons it seems desirable to readjust our ideas and get a true perspective of vitamin chemistry. For years physiologists taught that if one partakes daily of a diet containing protein, carbohydrate, and fat in certain proportions and minimal amounts, together with water and mineral salts, one has a perfect diet for maintenance and energy purposes. If this were really so, it would follow that when such a diet was prepared from chemically pure substances, physiologically it would be complete and sufficient. But it has been found that this is not the case, although when a small quantity of milk is also given, the diet proves satisfactory. Obviously milk contains something necessary for growth and life; and other substances are also found to supply the unknown factor.

We now know from the results of elaborate experiments that there are probably at least three of these vitamins, all originally of vegetable origin; and while there are those who would persuade us that we should take daily doses of various food-medicines now on the market, it is not necessary to do this in order to ensure our proper intake of vitamin principles. After all, the main nutrients required in our foods are to-day, as heretofore, adequate amounts of good proteins, carbohydrates, and fats. When our physiological needs as to these are satisfied it is safe to say that, in the case of Europeans living on an average varied diet of fresh foods, there has been ingested with these nutrients a sufficiency of the new food factors. No modification of one's normal routine is, therefore, required to keep one in health. In the case of those living on the poverty line, however, it is desirable to see that white bread and tea are supplemented by wholemeal bread, dripping, milk, and the green vegetables in as natural a condition as possible, with additional proteins (fresh meat, etc.) when these can be secured.

Sufferers from the results of malnutrition may be helped by the new knowledge to recast their diets in accordance with vitamin requirements. If we conclude that, so far as present results show, vitamins are probably not nutrients in the usual sense but necessary stimulants or activators of the digestive and assimilative functions, we shall realise more clearly the true rôle of these newly-discovered principles in human and animal economy.

The Rubber Research Association

In framing the Articles of Association, those responsible for the formation of the Research Association of British Rubber and Tyre Manufacturers, whose research laboratories were formally opened last week, did not overlook the fact that the applications of science to industry are many and varied in character. Research may result in fundamental discoveries which revolutionise industries, but such outstanding achievements are few and far between, and the importance of the application of research depends not so much on the possibility of revolutionary discoveries as on the more certain benefits which must result from the continued application of science to the improvement of existing principles and practice. The functions of the Association, therefore, include not only the study of the fundamental problems of the industry, but also the preparation of data and information in connection with the control of manufacturing operations and the testing of raw material and finished products for the use of members of the industry. Its work is therefore supplementary to that of the works chemist, physicist and engineer, and so far from reducing the number of technical men engaged in the industry, should rather exert the opposite effect by increasing their usefulness. Apart from its value to the rubber industry in studying its problems, supplying technical data, and providing a comprehensive collection of the literature relating to rubber and allied subjects, the Association should be of value to the public generally in providing a central organisation to which scientific questions relating to rubber can be referred, and as a means for co-ordinating the scientific work of the industry.

French and German Dyes

The recent announcement that an agreement had been reached whereby the Compagnie Nationale des Matières Colorantes would receive technical assistance from German dye chemists, again comes into prominence as a result of the publication of the company's annual report which contains the following passage:—

"The work of even the best technicians must be sterile unless they are in possession of all the knowledge accumulated in the past—knowledge which is essential to success. All who understand the complexity of the manufacture of organic colouring matters will realise why we have been compelled to acquire the patents, the processes, and the technical aid of our principal foreign competitors for exclusive use in France. Thus we have had at our disposal the results of fifty years of investigation, and processes minutely studied and methodically put into practice, and so we are immediately placed in a position equal to that of the most modern and most specialised firms in our industry."

As the French dyestuffs factories were mainly in the hands of Germans before the war, there exists at present a national anxiety to know to exactly what extent the French industry is dependent upon foreign, and particularly German aid. It is pointed out that when the war broke out there were neither materials nor workmen to produce dyestuffs, and in consequence no adequate provision for the manufacture of poison gas and explosives. If the Compagnie Nationale ceased to manufacture dyestuffs, it is argued, and if the day should again come when the rapid manufacture of explosives was essential, France would find herself as unprepared as she was in 1914. On the purely commercial side, too, care is called for in the acceptance of German aid in dye manufacture. The statement made in these pages recently to the effect that the German reputation is always some degrees better than the actual performance appears to be borne out by recent experience with German dyes. A correspondent of an

American contemporary testifies to the "fastness" of German dyes by calling attention to the fact that having bought a number of otherwise excellent socks in Germany, his feet are now dyed a beautiful brilliant green. A further example is furnished by a London firm who arranged to import cloth produced in Czecho-Slovakia, dyed with material presumably obtained from Germany. At first the quality of the dyes was quite satisfactory, but after several shipments had been made and confidence established, the importers found that the quality of the dye left much to be desired, while no redress could be obtained from the manufacturers.

While complaints against German dyes are increasing, it is encouraging to note the extent to which the British dyestuffs industry is now able satisfactorily to meet the bulk of the home demand. This growing competence is clearly reflected in the latest half-yearly returns issued by the Board of Trade which show a remarkable fall in imports of dyes and dyestuffs. For the first half of 1920 the total was £6,000,000, which dropped to £2,600,000 in 1921 and to £2,000,000 for the current year, the most remarkable figure being that of £255,503 for intermediate coal-tar products in 1920 compared with £22 for the last six months, when only one hundredweight of intermediates entered the United Kingdom.

A Cyclohexanol Discovery

THE properties of Cyclohexanol (Hexahydropherol) $C_6H_{11}OH$, a liquid boiling at 160° C., which is obtained by reducing carbolic acid with hydrogen, have excited comparatively little interest in the world of science, although this substance has been found to be of great practical utility. As a solvent there is much to recommend it. Owing to its high boiling point and flash point, it forms an excellent substitute for turpentine. It is invaluable for extracting essential oils from plants, flowers, and fruit, for its faint and pleasant smell has no ill effect on the aroma of the product. For the same reasons it should prove an excellent medium for diluting perfumes to a marketable strength. The compound has recently attracted attention owing to the discovery that if a small proportion of Cyclohexanol is added to soap the consistency of the soap hardly alters, yet this soap acquires the property of dissolving a considerable proportion of various hydrocarbons. Such compounded soaps dissolve easily in water, giving a thick permanent lather. They are excellent cleansing agents, particularly for fabrics, and will remove greases, waxes, mineral oils, etc. They are equally suitable for soft and hard water. So far as manufacture is concerned, the reduction of phenol with the aid of platinum and palladium is too expensive. The only processes of value for manufacturing purposes are those in which base metal catalysts, such as nickel, cobalt, iron and copper, are applied. The original method consisted in passing phenol vapours in a stream of hydrogen over reduced nickel or pumice covered with this material, but this process has the following faults:—(1) a large excess of hydrogen and high temperatures are required; (2) pure nickel is very susceptible to numerous catalyst poisons, such as chlorine, sulphur, arsenic and lead; (3) the reaction is not complete, so that the product has to be re-treated. These defects have been largely overcome by the employment of mixed catalysts and pressure.

The "mixed catalysts" consist of intimate mixtures of catalyst with oxides of the alkaline earth and rare earth metals. These inert substances function as "promoters," increasing the activity of the catalytic agent. A part of the effect is due, no doubt, to the power of the promoter to combine with halogens and other catalyst poisons. Possibly for this reason the addition of small quantities of caustic soda has a beneficial effect. The mixed catalysts retain their efficacy much longer than the pure metals, and are not so easily affected by impurities. They allow a lower temperature of reaction (100° C.) and give better yields. High pressures (10 to 15 atmospheres) act in an analogous manner. Another advantage of these improvements is that neither cyclohexanone nor cyclohexane are formed. In view of the large quantity of phenol which is produced in Great Britain, and the cheap price at which hydrogen could be obtained from water gas, British-made Cyclohexanol should be able to hold its own against all comers, and its manufacture on a large scale should lead to the establishment of by no means an unimportant industry.

Points from Our News Pages

Mr. Alwyn Pickles, M.Sc., contributes some notes on the poisoning of catalysts (p. 164).

In an article dealing with oils from the spices aleurites, Mr. J. Hedley Barry gives a concise account of the present state of our knowledge, and outlines future possibilities of development (p. 166).

Suggestions for developing the industrial uses of fish oils were made by Mr. H. J. Pooley at the Fisheries Exhibition (p. 170).

Details are given of a new co-partnership scheme introduced by Lord Leverhulme (p. 171).

Sir Ernest Benn points out the unlimited possibilities at present existing for trading with Europe (p. 172).

Our Scottish Market Report states that the past week has shown little change in the amount of business put through although inquiries were more numerous (p. 183).

According to our London Market Report the outlook is brighter and there has been a considerable amount of brisk trading during the week (p. 181).

Books Received

COURS DE CHIMIE. By Marcel Boll and Georges Allard. Paris: Dunod, Editeur. Pp. 352. 25fr.

TECHNICAL RECORDS OF EXPLOSIVES SUPPLY 1915–1918. No. 7—MANUFACTURE OF NITRIC ACID FROM NITRE AND SULPHURIC ACID. London: His Majesty's Stationery Office. Pp. 86. 11s.

The Calendar

Aug. 5	North of England Institute of Mining and Mechanical Engineers: Annual General Meeting. 2 p.m.	Newcastle-upon-Tyne.
12	The Mining Institute of Scotland: General Meeting.	Glasgow.
Sept. 4-9	American Chemical Society: Annual Meeting.	Carnegie Institute of Technology, Pittsburg, U.S.A.
6-13	British Association for the Advancement of Science: Annual Meeting.	City Hall, Hull.
20-22	Institute of Metals: Autumn Meeting.	Swansea.

Notes on the Poisoning of Catalysts

By Alwyn Pickles, M.Sc.

There are few more important problems in connection with the industrial use of catalysts than that of poisoning. The writer discusses some of the effects which are met with, and makes some suggestions which indicate how efficiency may be retained and restorsd.

WHILE certain substances almost invariably retard catalytic action, no rigid rule may be laid down. Water is a necessity in many gaseous reactions, yet it retards the dehydration of oxalic acid by concentrated sulphuric acid very considerably. In a few cases the catalyst becomes more efficient after use as is the case when nickel and iron are used together in the separation of hydrogen from water gas. In others, a catalyst being freed from its inhibitor becomes less susceptible to the action of that inhibitor. A good example of this is where iron pyrites are used as the catalyst material and support in one, in processes where sulphur is present.

Such a material was used in an attempt to oxidise ammonia in presence of sulphuretted hydrogen and air into sulphate and sulphite of ammonia.

The mixture of air, ammonia, and sulphuretted hydrogen was obtained by passing air through strong, yellow ammonium sulphide, and then leading the mixture through an iron tube at a temperature of about 600° C. The exit tube ultimately became choked with a white, hygroscopic substance which proved to be a mixture of sulphite and sulphate of ammonia. The relative amounts of these will depend on many factors such as temperature, relative amounts of the gaseous constituents of the mixture, and possibly on the past history of the catalyst material.

The catalyst material retained its efficiency remarkably well. Thus, though sulphur is regarded as a very powerful poison, it is not necessarily so.

Colloidal platinum, when used to decompose hydrogen peroxide, is said by Bredig to recover from carbon monoxide poisoning, and actually to become more active after a time. This decomposition was studied by using platinum black at temperatures of 12°, 18°, and 25° C. respectively. The peroxide used was about of one volume strength, and sufficient was made at the commencement of the work to serve for the whole series of the experiments. The effect of carbon monoxide, carbon dioxide, and of both these oxides taken together in equal volumes was also studied. The gases were allowed to enter the reaction mixture at the rate of about one bubble per second, the gas being displaced from the respective holders by means of a dropping funnel. The platinum black was used at the rate of ·10 gram per 200 ccms. of reaction mixture. The decomposition was followed in each case by titrating with permanganate. This permanganate was of the same concentration for all the titrations carried out. The results obtained are given below and are expressed graphically opposite.

The values of K are obtained by using the formula,

$$K=\frac{2\cdot3}{t}\log\frac{a}{(a-x)}$$

NO CATALYST.

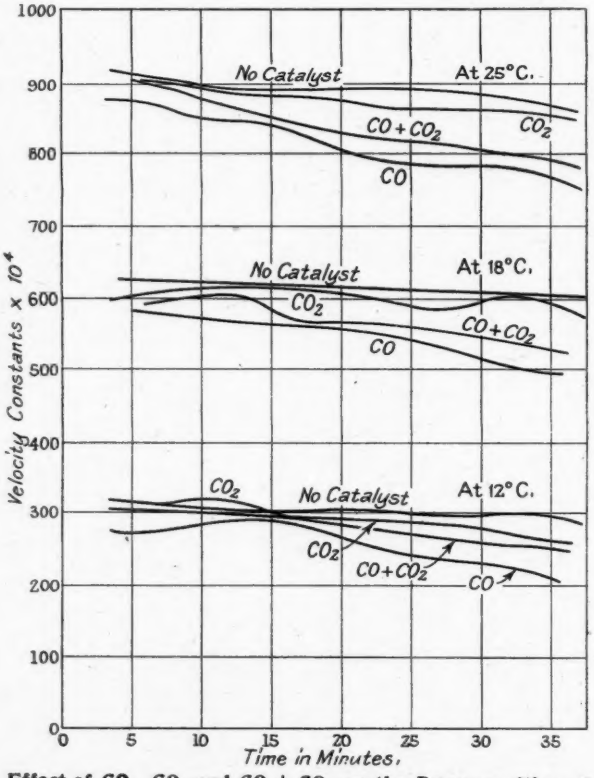
Time mins.	Amounts of Permanganate 12° C. ccms.	18° C. ccms.	25° C. ccms.	Values of K. 12° C.	18° C.	25° C.
0 ..	18·00	18·00	18·00	·03	—	—
3 ..	16·35	14·90	13·60	·0322	·0628	·0920
6 ..	14·90	12·40	10·35	·0315	·0624	·0912
9 ..	13·55	10·20	8·05	·0317	·0631	·0886
12 ..	12·50	—	6·15	·0303	—	·0889
16 ..	11·35	6·75	4·95	·0295	·0615	·0895
20 ..	10·10	5·40	3·00	·0302	·0601	·0895
25 ..	8·55	3·95	2·05	·0299	·0607	·0866
30 ..	7·35	2·80	1·40	·0297	·0621	·0895
36 ..	6·20	2·05	0·80	·0294	·0602	·0862
42 ..	5·30	1·50	—	·0297	·0592	—
50 ..	4·30	0·95	—	·0291	·0586	—

CARBON DIOXIDE.

Time. mins.	Amounts of Permanganate. 12° C. ccms.	18° C. ccms.	25° C. ccms.	Values of K. 12° C.	18° C.	25° C.
0 ..	18·00	18·00	17·90	—	—	—
5 ..	15·50	13·30	11·40	·0304	·0603	·0905
10 ..	13·40	9·80	7·30	·0295	·0610	·0895
12 ..	12·55	8·60	6·15	·0301	·0617	·0889
15 ..	11·55	7·10	4·70	·0297	·0610	·0890
20 ..	10·10	5·30	3·05	·0290	·0610	·0882
25 ..	8·60	4·10	2·05	·0296	·0594	·0864
30 ..	7·60	2·90	1·35	·0286	·0606	·0860
35 ..	6·75	2·25	0·90	·0280	·0592	·0853
40 ..	6·05	1·70	—	·0275	·0590	—
45 ..	5·25	1·35	—	·0274	·0578	—

CARBON MONOXIDE.

Time. mins.	Amounts of Permanganate. 12° C. ccms.	18° C. ccms.	25° C. ccms.	Values of K. 12° C.	18° C.	25° C.
0 ..	18·00	17·90	17·90	—	—	—
3 ..	—	15·10	13·75	—	·0590	·0882
6 ..	15·20	12·70	10·55	·0284	·0586	·0880
9 ..	13·50	10·65	8·30	·0288	·0582	·0853
12 ..	—	9·05	6·40	—	·0575	·0855
15 ..	11·75	7·65	5·10	·0278	·0570	·0839
18 ..	10·90	6·50	4·10	·0275	·0565	·0820
21 ..	10·30	5·60	3·40	·0266	·0555	·0790
24 ..	10·00	4·85	—	·0245	·0546	—
27 ..	9·20	4·20	2·15	·0248	·0538	·0785
33 ..	8·45	3·15	1·45	·0229	·0526	·0764
40 ..	7·50	2·40	0·95	·0216	·0504	·0734



Effect of CO_2, CO, and $CO + CO_2$ on the Decomposition of H_2O_2 in presence of Platinum Black

CARBON MONOXIDE AND DIOXIDE.

Time.	Amounts of Permanganate.			Values of K.		
	12° C. ccms.	18° C. ccms.	25° C. ccms.	12° C.	18° C.	25° C.
0 ..	18·00	17·90	17·90	—	—	—
3 ..	—	12·60	—	—	—	—
5 ..	15·50	—	—	·0281	—	—
6 ..	—	12·60	10·45	—	·0595	·0908
9 ..	—	—	—	—	—	—
10 ..	13·35	—	—	·0288	—	—
12 ..	—	8·70	6·25	—	·0605	·0876
15 ..	11·60	7·40	5·05	·0282	·0591	·0841
18 ..	10·80	—	—	·0278	—	—
20 ..	—	—	—	—	—	—
21 ..	9·95	5·40	3·15	—	·0573	·0825
24 ..	9·40	—	—	·0272	—	—
25 ..	—	—	—	—	—	—
27 ..	8·75	3·00	2·00	·0268	·0565	·0813
30 ..	8·10	—	—	·0266	—	—
33 ..	7·60	—	1·30	·0262	—	·0794
40 ..	6·65	2·05	0·80	·0250	·0543	·0778

The effect of carbon dioxide is small in any case, but even this diminishes with rise in temperature. The graphs of the reaction appear to suggest some periodic effect, and possibly this is so and due to the spasmodic liberation of the carbon dioxide from the platinum surface. A similar, if less pronounced effect, is to be noticed in the other cases. Carbon monoxide is seen to have a very much more poisoning effect than the dioxide.

It is of interest, and also of assistance, for an understanding of the action to consider the following factors:—

(1) The solubility of CO and CO_2 at different temperatures.
(2) The relative extent in which the gases are absorbed, and retained, at the platinum surface, as the temperature is varied.

SOLUBILITY OF CO PER CCMS. OF WATER.

Temperature ..	0°	10°	15°	20°	30°	40°
CO per ccm. ..	·035	·028	·025	·023	·020	·018

SOLUBILITY OF CO_2 PER CCM. OF WATER.

Temperature ..	0°	10°	15°	20°	30°	40°
CO_2 per ccm. ..	1·71	1·19	1·02	·88	·66	·53

The solubility of CO is small, but its rate of decrease with rise in temperature is much slower than in the case of the dioxide.

In the study of the retentivity of the gases, it was not found possible to use platinum, but some idea may be gained of the process by studying the retentivity, using a good charcoal.

Samples of a good cocoanut charcoal were exposed to carbon monoxide and dioxide respectively, so becoming charged with the respective gases. The charged charcoals were then placed in tubes closed at one end, and with a delivery tube fitted at the other. The tubes were then immersed in linseed oil and the delivery tubes so arranged that the evolved gases were collected in graduated tubes. The temperature of the oil bath was then raised and the gas liberated measured in each case. The temperature was raised to 190° C. in each case. The results are given as comparative but will serve to illustrate the retentivity of the gases with rise in temperature :—

Temperature	20°	30°	40°	50°	60°
CO liberated per ccm. charcoal ..	1·65	1·65	1·90	2·30	4·55
CO_2 liberated per ccm. charcoal	14·0	18·9	25·0	28·0	29·0

Temperature	70°	80°	90°	100°
CO liberated per ccm. charcoal ..	6·05	7·95	10·00	11·90
CO_2 liberated per ccm. charcoal ..	29·5	29·5	30·5	31·40

At 190° C., 1 ccm. of charcoal liberated 37·50 ccms. of CO_2, and the other charcoal, 14.80 ccms. of CO.

This variation in the retentivity of gases by charcoal is well known. The following results were obtained in the case of ammonia and hydrogen chloride.

The temperatures were obtained by having the charcoal in a tube round which vapours were allowed to pass. The vapours used were those of alcohol, acetone, and water. Other temperatures were got by using room temperatures and that of water in which ice is melting. Two kinds of charcoal were used in order to show if there is any difference in the kind of charcoal used.

(1) COCOANUT CHARCOAL DUST.

Temperature	0°	12°	56°	79°	100°
Vol. NH_3 per ccm. of charcoal ..	78·2	56·4	35·0	24·6	18·0
Vol. HCl per ccm. of charcoal ..	51·5	38·2	32·0	29·5	23·5

(2) BIRCH CHARCOAL DUST.

Temperature	0°	12°	56°	79°	100°
Vol. NH_3 per ccm. of charcoal ..	60·0	37·0	20·0	11·6	8·4
Vol. HCl per ccm. of charcoal ..	42·0	31·5	29·5	26·0	20·0

A study of catalyst poisons often shows that they are capable of oxidation. Thus an arsenite, is more poisonous, as a rule, than an arsenate, and we have seen that CO is more poisonous than CO_2. Though adsorption of a substance does not appear to depend on the state of oxidation, it is possible that the retentivity may be affected. Thus, if ferric hydroxide is used for the distribution of an arsenate and also of an arsenite, it is found that, though the arsenate is adsorbed to a much larger extent than in the case of the arsenite, the arsenite is retained with a much greater tenacity.

It is usually necessary to remove all source of poison from a reaction mixture before it reaches the catalyst, as a catalyst can rarely be renovated *in situ*. In many cases, especially in the case of sulphur poisons, the catalyst may be renovated by heating in a stream of air made richer in oxygen by artificial means. By this means a lower temperature will suffice and the support does not suffer to the same extent.

Institute of Chemistry

Pass Lists in the July Examinations

THE following Associates of the Institute of Chemistry have passed the examination for the Fellowship :—In Branch A II, Metallurgy (1 entered and passed) : Oakley, Percy Dale, B.Sc. (Lond.). In Branch E, The Chemistry, including Microscopy, of Food and Drugs and Water (4 candidates entered of whom 2 passed) : Essery, Reginald Ernest, B.Sc. (Bris.) ; Walmsley, James Rawson, A.M.C.T.

The following candidates have passed the examination for the Associateship :—In General Chemistry (45 candidates entered of whom 28 passed) : Bateman, Alan Hamilton, Birkbeck College, London ; Berchem, Rudolph Otto George Alexander, Birkbeck College, London ; Brow, William Thomas, B.Sc. (Edin.), Heriot-Watt College, and the University, Edinburgh ; Carmichael, Kenneth Francis, Heriot-Watt College, and the University, Edinburgh ; Cooler, Harold Frederick, East London College ; Crawley, Ailsa Victorian ; University College, London ; Easterbrook, William Caulton, Royal Technical College, Glasgow ; Eastland, Cyril Jack, School of the Pharmaceutical Society ; Fairgrieve, Jessie Helen Carroll Dick, Heriot-Watt College, Edinburgh ; Fritz, Jack, Leeds Central Technical School ; Grant, James, Heriot-Watt College, Edinburgh ; Haslam, Margaret Mary, B.Sc. (Lond.) ; Herd, Clifford Walter, University College and Sir John Cass Technical Institute, London ; Kekwick, Leslie Oliver, University College, London ; Luke, James Trewhella, King's College, London ; Mathie, John Richardson, Royal Technical College, Glasgow ; Maunder, Archibald George Daw, University College, London ; McGregor, Percy, Heriot-Watt College, Edinburgh ; Melhuish, Barradale Whiddon, School of the Pharmaceutical Society ; Miller, Herbert Frederick, Birkbeck College, London ; Mitchell, Robert Edward, South Western Polytechnic, London ; Polglaze, Gordon Henry Francis, King's College, London ; Richardson, William Robert, University College, London ; Rigden, Horace Walter ; Schorn, Edwin John, Heriot-Watt College, Edinburgh ; Stokoe, Hector Vivian Thurlbeck, B.Sc. (Lond.), Armstrong College, Newcastle-on-Tyne ; Tucker, John Morgan, University College, London ; Wallace, Dorothy Orford (Nat. Sci. Tripos, Cantab.), Girton College, Cambridge.

Under regulations in force prior to March, 1920. In Branch (a) Mineral Chemistry (4 entered of whom 2 passed) : Cutting, Percival Harman ; Laing, Thomas Edward, South Western Polytechnic, London. In Branch (d) Organic Chemistry (4 entered of whom 3 passed) : Dodds, George Elliot, Heriot-Watt College, Edinburgh ; McCartney, William, Heriot-Watt College, Edinburgh ; Renton, Archibald, Heriot-Watt College, Edinburgh. In Branch (e) The Chemistry, including Microscopy of Food and Drugs and Water (3 entered of whom 1 passed) : Pearson, Margaret, South Western Polytechnic and Battersea Polytechnic, London.

Oils from the Spices Aleurites

By T. Hedley Barry

THIS small genus consists of five or six species and belongs to the family Euphorbiacæ (or Spurge), to which also belong several other plants producing valuable oils, such as castor and croton oil.

It has become of great interest to the paint and varnish trade during the past few years, due to the fact that several of its members secrete oils possessing unique properties which have already made them valuable additions to that trade's raw materials; and there is every reason to believe that as they become more fully understood and the supply of them more consistent in quality and quantity their importance in the trade will increase.

The members of the group are found mainly in China, Japan, and the islands of the Archipelago. Though it is comparatively recently that the oils obtained from them have excited the interest of Europeans their properties have been known to the Chinese for several hundred years. Apparently they were first introduced into Europe by Prestello, a Portuguese trader, in 1516, and for the next three centuries the oil was exported from Canton under the name of "tung oil." It does not appear in European Customs returns until 1897. The name was extended to include all the oil of a similar character from these regions. The name "T'ung" is applied by the Chinese to several trees possessing heart-shaped leaves but not necessarily allied botanically. The bulk of the oil exported from China is the product of Aleurites Fordii, but others, notably A. Montana, have contributed to the supply.

Now that the oils have established themselves in the Occidental market the necessity of an exact knowledge of their origin and the difference in the properties of the varieties is a matter of considerable importance, especially as the present supplies are by no means altogether satisfactory either as regards quality or quantity. At present China is the source of the bulk of the oil, but the possibility of its production under more scientific conditions is a matter in which both America and Great Britain have considerable interest.

It is the aim of the writer to give a concise account of the present state of our knowledge and the future possibilities of development.

Probably the most complete survey of the subject yet made is that by Wilson (*Bull Imp. Inst.*, XI., 441 (1913)), to whom all subsequent writers, including the present, must express their indebtedness.

Briefly, the botanical history of the species is as follows:—In 1786 Lamarck under the name Dryandra Oleifera described a tree having the flowers, leaves and shoots of what is now termed Aleurites Cordata, and the fruits of the tree at present known as A. Montana. Later A. de Jussien gave the name Eleaococca Verrucosa to one possessing the flowers of A. Cordata and the fruit of A. Fordii.

A. Fordii was first clearly defined by Helmsey in 1906, but he seems to have failed to distinguish it from the Japanese species A. Cordata. The work of Wilson referred to above appears definitely to have settled the problem as regards these three. There still appears to be doubt in some quarters as to whether A. Trilobia and A. Mollucana are identical, a point which will be referred to later.

Aleurites Fordii

Turning to the individual members of the species, A. Fordii is of the most immediate interest, as it is the one which appears to be the most likely to prove suitable for cultivation in lands under the direct supervision of the white race.

It is known to the Chinese as T'Ung-yu-shu and is mainly found in the West and Central Fokien Provinces and is the source of the bulk of Hankow oil. It has been cultivated by the Americans, and the oils obtained were favourably reported upon.

The best results were obtained from trees grown in North-West Florida, South Georgia and Alabama (1916), but reports on oils from Californian experimental plantations were not satisfactory owing probably to the climatic conditions being unsuitable. Oils from other stations, however, gave satisfaction, and the best were stated to be equal to the best Chinese product (*O. and C.T.J.*, 1918, p. 123).

It is suggested that it might successfully be cultivated in India and in South and East Africa and parts of Australia. Some preliminary experiments were started in India and Ceylon a few years back but no results have been published so far as the writer is aware at present (*Bull Imp. Inst.*, XVII., p. 248).

The tree will grow in a hot temperate climate where the rainfall is over 70 in. It is of fairly rapid growth and bears fruit after six years. The fruit is about the size of a small orange and bursts when ripe, liberating two or three seeds, which are something like small Brazil nuts but with a thinner shell.

The fruits are gathered by the natives and roasted in iron pans over a fire until they crack, and the seeds are then ground in a stone trough with a stone roller moved by oxen. The meal is then pressed in an arrangement after the style of the old cider press and the oil marketed.

The extraction is facilitated by steaming. The oil is said to be very poisonous when first extracted. According to other writers the fruit is collected before ripe, and allowed to ferment in heaps under grasses and earth. The husks rot and the kernels are thus liberated. Probably both processes are in use. As will be shown later, the fruit of A. Fordii is more susceptible to fermentation than that of A. Montana, and possibly the process adopted varies according to the origin of the fruit under treatment. The oil as it reaches Europe is frequently adulterated with Sesamé or Soya bean oil, and even lacquer varnish, a practice which was noted by D'Incarville as early as 1735.

The oil so obtained is used by the Chinese for a great variety of purposes. Marco Polo describes how the boatmen of the Yangtze-Yangtze varnished their boats with a composition of wood oil, hemp and lime which produced a film of remarkable water resisting quality, and the process is still in operation to-day, nearly six centuries later.

It is also burned to produce lamp black, and in some remote parts the peasants use it as an illuminant in spite of its smoky flame.

Aleurites Montana

This is also an inhabitant of China, where it is known as mu-yu-shu. It is common in the southern parts, especially in the neighbourhood of Wuchow. It was first given a specific botanical name by Louriero, a Portuguese, who in 1779 named it Vernica Montana.

As already stated, it has been confused with A. Fordii, from which, however, it differs in several ways. It is not nearly so hardy. The fruit is thicker and more woody than that of A. Fordii, and hence is not so easily rotted by fermentation.

It is the principal if not the sole contributor to the supply of "Canton oil," but it appears doubtful if an authentic sample has ever been knowingly examined by a chemist.

Aleurites Cordata

This is the Japanese tree. It has much smaller and more fragile fruit than the Chinese trees, and is quite distinct from all other members of the species. The oil does not polymerise as does the Chinese, and its gravity ·935 is lower than that of the other oils from the species. The oil described by Chapman (*Analyst*, 1912, p. 543) as from Paulonia Imperialis is ascribed to this tree by Wilson, who examined the fruits analysed by Chapman.

That this should be the case is the more readily understood when it is recalled that the trees of the species Paulonia possess large heart-shaped leaves, and consequently would be termed T'ung by the Chinese.

According to Brandis (*Indian Trees*, 1907), it is cultivated in North-West India.

Aleurites Moluccana and Aleurites Trilobia

These were at one time considered to be distinct species, the A. Trilobia being distinguished by having leaves with three lobes, whereas the Moluccana had non-lobed leaves.

Leaves of both types, together with leaves of the transitional stages, have been found on the same tree, and the identity of the two may be considered established. (*Semlar Trop. Agr.*, II., 517 (1913)).

Aleurites Moluccana is found over a wide area from Polynesia to India. It is the source of candle nut oil or lumbang oil. The

fruits are known in the Philippines as "lumbang bato," or "stoney fruit." It is also grown in India, where the oil is known as "kekuna oil."

It is a handsome tree and in Hong Kong is valued for its shade.

The oil has been the subject of extensive investigation (*Philippine Journ. Science*, 12A, 235, and 11A, 443,) and also by Gardner (*J.S.C.I.* (1918), 215A and (1919) 687A and 952A). The nuts yield about 60 per cent. of a yellow oil which, though possessing slight purgative properties is not as are the kernels—poisonous. It possesses, apparently, an advantage over the "soft lumbang oil" (from A. Tristpema), in that it does not "set up" when mixed to form a paint with red lead. Its gravity is given as 0·925 and iodine value 150.

Aleurites Tristpema

This is the source of the "soft lumbang oil" which has been the subject of much attention on the part of the American paint manufacturers.

The tree is confined to the Philippine Islands where, though widely distributed, it is less common than the A. Moluccana. The Americans have planted 5,000,000 trees, and the cocoa factories have been induced to take an interest in the exploitation of its products. It is stated to prove of great value to the American trade, and apparently its reaction with red lead already referred to must not be allowed to weigh too heavily against it. The same effect is sometimes noted with linseed oil and is probably due as much to the individual properties of the red lead as to the oil, since the pigment varies considerably both in chemical and physical properties, which have considerable bearing on the property of "setting up" (see *Sabin Paint and Varnish Technology*, p. 284 *et seq.* (1917), also *Red Lead and How to Use It*, p. 8).

The fruit is collected in August. The kernels, which have a thinner shell than the "lumbang bato," yield an oil more viscous and darker than that from A. Moluccana. The oil is suitable for the manufacture of soft soap and as a paint material.

It dries with a matt surface, but this difficulty can be overcome, according to Gardner, as in the case of tung oil, by the use of a suitable dryer (he suggests 10 per cent. of a lead-manganese mixture (*loc. sit.*).

The general properties of the oil are intermediate between linseed and tung oil. On heating to 280° for 15 minutes there is a distinct increase in viscosity, though there is no solidification. Its gravity is given as 938, iodine value 145-165.

In conclusion, it may be of interest to note that another member of the species Aleurites Luccifera found in the Antilles and in Ceylon yields a kind of gum lac as a result of the sting of an insect, but apparently no oil is obtained from it.

In view of the statements as to the poisonous character of tung oil it is of interest to note that several of the Euphorbiacæ yield poisonous products, and that one of them is the source of the milky juice used by the natives of Brazil to poison their arrow heads.

Nauru Island Phosphates

ACCORDING to information supplied by Mr. Hughes, the Australian Prime Minister, it is expected that during the next season increasingly large supplies of superphosphates from Nauru and Ocean Islands will be available for farmers at cheaper rates. During 1921 the total output from Nauru and Ocean Islands was 394,051 tons, which is 55,000 tons more than the output obtained during 1913, the best year under the Pacific-Phosphate Company. The output for the first 18 months of the period during which the commissioners had control was 554,656 tons, of which Australia took 357,496 tons, or almost 65 per cent., although she was entitled to only 42 per cent. under the agreement. Demand for the phosphates has increased enormously in Australia. The price of phosphates delivered in Australia during the past 18 months has varied from 75s. to 80s. per ton, the average being 77s. 6d. For the superphosphates, the average price to the Australian farmer during the same period has been £6 per ton. World prices for superphosphates of equal, and even lower grade, have ranged from £8 to £11. Workmen employed in the manufacture of superphosphates numbered 2,200. There were enough phosphates to supply requirements for the next 200 years. The commissioners hoped that the cantilever and new loading scheme which they had decided to introduce would enable them to supply even a larger amount at cheaper rates.

Reply to Lord Birkenhead

(Vigorous Protest from Traders)

IN a brochure issued by the Association of British Chemical Manufacturers, Lord Birkenhead, under the title, "Shall German Brains Beat British?" reviews the case for the development of the British fine chemical industry. Dealing with the menace of Germany he states that the German method, as is well known, is to undersell in all those lines of manufacture upon which their competitors are engaged, and to demand high prices in every other. Then, as soon as competition has been effectively silenced, they jump up the price, and, from the seat of custom, collect a tax from the rest of the world. There can be no doubt whatever that, if the German efforts to regain the monopoly lost during the war are successful, exorbitant prices will be demanded for those chemicals which are now made by us. At the same time, the German trader, by selling direct in overseas markets, is steadily undermining our position in regard to foreign trade. Further, dealers and agents working for German and French interests in this country have spent money freely in order to upset the Dyestuffs and Safeguarding of Industries Acts. These enactments were made with the object of protecting key industries, and not, as has been suggested, in order to prop up an industry just because it is not remunerative.

Safety of the Nation

The political adherents of Free Trade, he continues, overlook the fact that this is not a political question, but a national question. They forget that John Stuart Mill himself laid down the doctrine that fixed principles must be abrogated when the safety of the State is at stake. They are ready to throw in their lot with those whose interests lie in being able to import chemicals, and who in reality wish to shut down the British manufactures, making us once again, in regard to chemicals, a nation of shopkeepers.

Continuing, Lord Birkenhead states that this agitation is the work of avaricious wolves, who are anxious to make profits by selling German chemicals. Why should they be allowed to don the sheep's clothing of Free Trade and to sacrifice their country for the sake of monetary advantage to themselves? There is no other way to regard these men than as traitors who have failed to learn the lessons of the war.

In conclusion Lord Birkenhead states that the real opposition to the Safeguarding of Industries Act comes from those whose pecuniary interests lie in the buying and selling of foreign chemicals—brokers, dealers and their advisers. These people, regarding the Act from a purely selfish point of view, are not concerned that England should become self-supporting and independent of Germany. They would prefer that we should drift back to the pre-war condition of dependence on a possible enemy.

Chemical Traders' Protest

In connection with the above statement the following resolution was passed by the Emergency Committee of the Chemical and Dyestuff Traders' Association on Wednesday:—

"On behalf of the Executive Council of the Chemical and Dyestuff Traders' Association, we protest most emphatically against the wanton and unjustifiable attack upon chemical traders made by Lord Birkenhead, the Lord High Chancellor, in the pamphlet circulated to Members of Parliament and others on Monday last. The charges made not only constitute a flagrant abuse of the powers of his high office but show a lamentable ignorance of the elementary principles of trade."

Tannic Acid from Doga Bark

THE Doga Timber and Tannin Extraction Company has been formed in Suva, Fiji, for the purpose of extracting tannic acid from the bark of the doga tree, which grows in the mangrove swamps on the foreshores all around the islands. The proposal is to extract the tannic acid and ship the crystals to England. The timber, some of which grows to a fair size, will be sawn into logs and used locally. The company has all the doga rights of the Island of Vitilevu, the largest of the group. Machinery has been imported, and it is reported that a beginning will soon be made.

Reviews

AN INORGANIC CHEMISTRY. By H. G. DENHAM, M.A., D.Sc., Ph.D., Professor of Chemistry, University of Capetown. London: Edward Arnold and Co. 1922. Pp. 683. 12s. 6d.

A noteworthy feature of this book is its clear exposition of modern theories relating to chemistry, and it is interesting to observe that the hypothesis advanced by Prout in the year 1815 that all the elements are derived from hydrogen is receiving increasing attention. To aid the student in correlating and classifying chemical reactions and principles, Dr. Denham has emphasised the basic, amphoteric, or acidic nature of the various oxides, because with this knowledge the probable behaviour of compounds derived from the oxides may be predicted. From the study of the ionic theory he passes to the chemistry of the metals, where the ionic theory may be most usefully applied.

A chapter devoted to typical carbon compounds deals with the paraffin series of hydrocarbons and certain other compounds of carbon which are commonly discussed in books on organic chemistry. The section dealing with coal-gas is hardly up to the high standard of merit which marks the greater portion of the book. In the table showing the amount of gas evolved from English bituminous coal at different temperatures the author might have given the volumes in cubic feet instead of in cubic metres, and the gas analyses might have shown the presence of carbon dioxide. Town gas is not now usually purified by lime, and carbon dioxide is invariably a constituent of the gas evolved during the carbonisation of coal. Dr. Denham states that amongst the by-products of the coal-gas industry the coke forms an excellent fuel, especially for metallurgical work. Gas coke is not usually regarded as excellent for metallurgical work, otherwise the coke oven industry would not be so important. The chapter on "Flame" is short, but clear and interesting.

The final chapter, which discusses radio-activity and the constitution of matter, easily holds the attention of the reader, and will tend to stimulate the imagination of the student. No reasonable doubt remains, says the author, of the radio-active origin of lead, and he explains and accepts the theory of isotopes. The transmutation of the elements has, he tells us, begun and the dream of the alchemist appears at hand.

H. F. H.

PRÉPARATION DES MÉDICAMENTS ORGANIQUES. Par Ernest FOURNEAU. Paris: J. B. Baillière et Fils. 1921. Pp. 350.

This is a book likely to prove extremely useful to those engaged in teaching advanced organic chemistry, particularly in places where this subject is taught with appropriate regard to its industrial aspects. The book is founded on a series of lectures on medicinal organic chemicals, and deals with most of the important substances of this class, as, for instance, phenacetin, antipyrine, veronal, salvarsan, novocaine, stovaine, digitalin, and atropine.

There are two divisions to the book. In the first the syntheses of the individual substances are dealt with from the standpoint of theoretical chemistry; in the second the methods of preparing them on a laboratory scale are given step by step.

In regard to the first division the subject is approached from the utilitarian point of view: thus the author explains the train of reasoning which led him to experiment with particular substances in the search for a perfect local anæsthetic, work which ultimately resulted in the discovery of stovaine. He also in places deals with such practical considerations as questions of relative cost and methods of testing the compounds.

Of greatest value is the second part, in which will be found concise, clear and practical details for the preparation of the substances on a small laboratory scale. This is admirably done.

The diversity of the compounds concerned is such that one may recommend the book to both teacher and student as one which, if used as an advanced practical textbook, would acquaint the student who had carried through a suitable selection of the preparations described, with the principal methods of the organic chemist. It is safe to say that a larger number of students would have their interest in organic chemistry keenly awakened if books of this nature were used in the place of the usual books on organic preparations.

The reader naturally turns with interest to the pages dealing with stovaine, for the discovery of which the world is indebted to the author, though it is not to be supposed that this substance receives more than a reasonable share of attention. Stovaine is dimethyl-amino-dimethyl-ethyl-benzoyl-carbinol hydrochloride. The process described involves the making of mono-chloracetone and dimethyl-amine; the former is esterified by Grignard and combined with the latter. The benzoylation is effected with benzoyl chloride, for the preparation of which a full description is given of the Sandmeyer method, starting with aniline, and the Grignard method from bromo-benzene. This is but an example, but it will perhaps convince the reader as to the wide range of the book, as well as to its usefulness to the teacher. It is also a book which will prove valuable to those engaged in research on medicinal chemicals and those concerned with their manufacture on a large scale, though no pretensions are made to give technical manufacturing details.

F. H. C.

CHEMISTRY FOR BEGINNERS AND SCHOOLS. By C. T. KINGZETT, F.I.C. Fourth Edition. London: Baillière, Tindall and Cox. 1922. Pp. 237. 5s.

This is a very elementary book suitable for the use of young school-children. A considerable portion of the book consists of a glossary and index in which the meaning of such simple words as abrasive, absorbent, dense, expansion, distillation, ignition, and many others which are familiar to every adult are explained. A further portion of the book is devoted to illustrations and descriptions of such simple apparatus as funnel-stands, crucibles, basins and flasks.

The author intends this book to be used in primary schools, and says that much or all of the information it contains may be conveyed to pupils by using the several sections as mere reading matter where there are no facilities for giving laboratory demonstrations or making illustrative chemical experiments for the pupils to witness. It is difficult to believe that an intelligent grasp of even the rudiments of chemistry can be acquired by schoolboys under such conditions.

The book is divided into five sections. The first deals with the constitution of matter, chemical changes, valencies, acids, bases, salts, and weights and measures; the second discusses light, heat and electricity; the third describes hydrogen, nitrogen, and all the other important elements; the fourth describes and illustrates chemical apparatus; and the fifth is the glossary and index.

The book is good as far as it goes and the novice will find it useful. The modest claim of the author that the information it contains will qualify those who acquire it readily to progress to a fuller knowledge of chemistry may be admitted.

H. F. H.

Nitre Pot v. Ammonia Converter

To the Editor of THE CHEMICAL AGE.

SIR,—I have read with much interest the articles in the last two issues of THE CHEMICAL AGE on "Nitre Pot *v.* Ammonia Converter," and agree with your correspondent "Questor" that the nitre pot is by no means yet played out. Its simplicity and the ability to operate it with unskilled labour are immense advantages. At a works which I visited recently they had gone back to the old system of using small nitre pots, charging them outside the oven and pushing them in. Crude though this may seem, it does away with the trouble caused by large nitre pots cracking, especially at starting up or when the pots are exposed to too great a heat. Damage to the potting oven may be avoided by placing the pots in a shallow iron tray.

There is no comparison between the cost of these small pots and that of the usual type, and they are instantly replaced if damaged.—Yours, etc.,

L. CARPENTER.

143, Palmerston Road,
London, N.22.

Analysis of Slaked Lime

To the Editor of THE CHEMICAL AGE

SIR,—Your correspondent, Mr. Tiddy, invites criticism of his proposed method for the analysis of slaked lime.

It has several disadvantages. In the first place, it is an indirect method based on a difference of molecular weights, namely 100–74, consequently the error of titration will be magnified four times in calculating the $CaCO_3$ percentage. Without special precautions it is not easy to do titrations closer than 1 in 500, and this would mean an uncertainty of 0·8 per cent. in the calculated $CaCO_3$.

More important still, however, is the assumption that slaked lime contains neither free water nor quicklime. This is by no means true. In dozens of analyses of samples of silk-sifted slaked lime I made some years ago, it was obvious that the total water present could vary 1 per cent. each way of the amount required in theory. This would upset the suggested method altogether.—Yours, etc.,

E. C. CRAVEN.

18, Belsize Grove,
Belsize Park, London, N.W.3.

The Training of Chemists

To the Editor of THE CHEMICAL AGE.

SIR,—A student, ex technical school, University and trade laboratory, was desirous of entering the paper trade, to which his course of study had been directed. He sought employment in vain over a period of two and a half years, and finally his father consulted the writer, who advised entry from the bottom, *via* the industries that provide the raw materials. Three years have been spent (mostly as an ordinary labourer) in these industries, with special application towards acquiring all the collateral knowledge possible, in the evenings.

In November last year he entered a paper mill as an ordinary labourer, and on his third day there a timely skilful correction of one machine saved many pounds, with the inevitable "carpet" interview, and subsequent rapid promotion.

He has been offered, and has accepted, an oversea appointment at a four figure initial salary—only eight months after his entry as an ordinary wages man.

The letter of appointment says: "It is not only your ability and broad knowledge as a chemist, but the extent of your knowledge of collateral matters and the ease and certainty of application of such that has been the deciding factor."

He not only maintained himself, but has returned to his father a considerable part of the cost of his education. Further comment is superfluous.—Yours, etc.,

"CHINA-CLAY."

Bojea,
Cornwall.

A Good Example

To the Editor of THE CHEMICAL AGE.

SIR,—With reference to your editorial article on the above, the test of the value of such papers is whether they record accurately, and in detail, what we actually see, what we think we see or what we would like to see. To my mind the inculcation of the habit of close, accurate observation, with its sister, sound deduction, surely leads to rapid application. All such steps are sound, however humble their origin.—Yours etc.,

T. J. M.

Ninety Years of Science

To the Editor of THE CHEMICAL AGE.

SIR,—I have read with considerable interest your editorial article on the recent publication of the British Association dealing with its activities during the past ninety years.

Your remarks regarding the public interest in scientific work generally and chemical progress in particular are specially apropos. The point, however, which appeals to me most is that referred to in your concluding sentence, *viz.* how to make the public take a greater interest in modern scientific developments. You appear to suggest that this loss of interest is due, to a considerable extent, to the fact that each branch of science has developed a language of its own, which is so obscure that it is difficult for outsiders to follow. There is no doubt about the truth of this assertion; but it is very difficult to see how it can be altogether overcome, except by the appointment of someone, who could act as an interpreter for each branch of science, whose duty it would be to translate those articles of fundamental importance into a language which could be understood by the layman. Men who could do this in a satisfactory manner are few and far between. Dr. Miall has recently shown by his articles in your journal on atoms and isotopes, etc., that he has a happy aptitude for this kind of work, but even he would find it exceedingly difficult to get down to the level of the man in the street in many cases. I have had some experience in this direction, first as a lecturer, and now as director of a research association, and know some of the difficulties of attempting to explain the applications of science in industry to laymen. The chief difficulty appears to me to be in the total ignorance of the general public of even the most elementary facts of science, so that even the simplest terms used require to be carefully explained. A further difficulty arises from the fact that the average man does not seem to be able to concentrate his mind on any subject outside his own special province; consequently when he reads an article of a scientific description he reads it as he does his morning newspaper, hurriedly and without exercising a special effort to understand it.

It seems to me, therefore, that before one can hope to interest the general public in scientific development, not only are the necessary interpreters required, but a more understanding and thoughtful public. The latter can only be brought about by having more science taught in all elementary schools. I understand that a little science is now taught in most schools; but as this is only a comparatively recent development it will be necessary to wait till the children of to-day form the bulk of the adult public in order to see what effect this teaching has had on the attitude of the general public towards science. My own experience has been that where an individual has been taught some science, even if he has forgotten most of it, he is always more interested in, and more sympathetic towards the applications of science to industry. In advocating the teaching of more science in the schools, I do not mean to suggest that scientists should wait till this desirable result is achieved, but this object should be one of the first on the list of any propaganda work which may be started by such bodies as the societies you name. Meantime a great deal could be done by chemists and others connected with industry if they would endeavour by means of popular lectures, etc., to interest their fellow employees of all grades in the application of science to their own particular industries.

You too, Sir, with your expert knowledge of publicity work, could help by giving illustrations in your journal of how such articles should be written, so that many of us, who have not the natural aptitude for such work, might do the next best thing, namely, copy those who have.—Yours, etc.,

T. MACARA,
Director of Research,
British Association of Research for the Cocoa, Chocolate, Sugar Confectionery, and Jam Trades.
2 and 4, Dalmeny Avenue,
Holloway, London.

Fish By-Products

The Industrial Uses of Fish Oils

In the course of a paper read on July 28, at the Fisheries Exhibition, London, Mr. H. J. Pooley stated that as fish had so long been regarded purely as an article of diet it was surprising to find the extent to which its derivatives had penetrated into industrial use. The urgent call for the restoration of balance in the natural resources of the world had at last aroused interest in the possibilities of waste products as distinct from the always present glut waste of this everyday commodity.

Dealing with the fishing industry as apart from the whaling industry Mr. Pooley said that the recovery of waste must take its development alongside the work which had already been commenced in the preparation of dried sewage manure, the recovery of potash from furnace flue dust, wool-washings, distillery waste, etc., and endeavour should not be arrested until we had placed ourselves on terms of equality with countries like China, where for centuries an intensive cultivation had been pursued without the introduction of foreign fertilisers of any kind.

The three chief by-products of fish, continued Mr. Pooley, were edible fish meal, guano, and oil. Fish oil could not at present replace all vegetable oils on the score of quality, but it could be used to the utmost limit of its production to replace others. The dry residue could be employed without limit not only to the profit of the producer but to the actual benefit of the consumer.

Dealing with the treatment of fish offal, Mr. Pooley said that oily fish offal was not suitable for drying direct. Until quite recently no process was available for the complete removal and recovery of the oil, but partial recovery had long been practised.

Cod Liver Oil

A branch of the fish by-product industry worthy of closer attention in this country was the product of cod liver oil. Although other countries had the bulk of the business in the shape of medicinal cod liver oil we were practically non-producers owing to the custom of allowing the crews of trawlers to take the livers as perquisites; the livers were disposed of on landing to the oil manufacturers, but as by that time decomposition had set in the livers were only suitable for industrial oil. After reviewing the methods of handling waste and the plant used the author proceeded to deal with treatment of white fish. Disregarding any recovery of oil, the commoner system was to dry the fish in machines working at atmospheric pressure with mechanical agitation of some kind. The heat was applied either by steam jacket or by direct fire. The most up-to-date form of fire-heated dryer consisted of a long cylinder which rotated and had an inclination towards the discharge end. Material was introduced to a hopper with a regulating feed, and the hot gases and some of the flame from the fire passed directly into contact with the material which gradually progressed towards the lower end where it was discharged.

Preserving the Nitrogen Content

Realising the importance of preserving the full nitrogen or ammonia content of the material and of avoiding nuisance, George Scott and Son (London), Ltd., had produced a machine for carrying out this work under reduced pressure, i.e., the natural pressure of the atmosphere was removed from the interior of the apparatus and the boiling point lowered to about half the normal boiling point. The material was then heated by direct contact with the jacket and the temperature under these conditions need never exceed about 110° F.; the process was rapid and the work was entirely innocuous. It was found that the fumes from drying fish were almost entirely soluble in water provided that no air was mixed with these fumes. As there was no air inside the apparatus the fumes were in the state required. They were led to a condenser while still under vacuum and there cooled and absorbed in water which never reached a high temperature. The result was complete immunity from any question of offensive odour arising out of the process itself. With regard to the production of manure it should be finely ground and sifted before marketing, and in this connection it should be remembered that the presence of lime and phosphoric acid due to the bones, was a valuable ingredient of a complete animal or plant food.

The main source of fish oil, continued Mr. Pooley, was the general offal of oil-bearing fish of which the herring in this country, the salmon, and the inedible menhaden in America, were perhaps the three best examples, not forgetting, however, the sardine industry of the west coast of Europe and that of India. The older system of treating these materials might be described as a preliminary cooking process followed by a mechanical pressing with and without heat. Various attempts had also been made to deal with the problem by solvent extraction, but most of these were unsuccessful. Some years ago G. Scott and Son introduced a system of extraction by means of solvent in vapour form, the vapour being generated in a tubular steam-heated boiler. This vapour was passed into contact with the material in a special manner. The material was agitated at the same time, and by this means the vapour simultaneously searched the meal, drove off the natural moisture and combined with the oil. The fish became dried right out, but remained in an open porous form quite different from the material produced by preliminary drying. From this stage the extraction was very rapid, and the amount of solvent remaining in the meal was much smaller than when the liquid treatment was employed. The final traces of solvent were removed by passing in dry steam.

Recovery of Solvent

The oil and solvent mixture was separated by distillation in the ordinary way, the solvent being recovered and the oil, after simple washing, being ready for packing or the next stage in its development. Before leaving the question of distillation, the author referred to a new method which he thought would be suitable for larger installations. It should be understood that live steam in all these distillations was driven through the solvent mixture, the steam and vapour passing away to the condensers, being condensed together and afterwards separated by the difference in their respective specific gravity. This work was done in intermittent charges, and while the mixture of solvent and oil was weak the work was easy, but as the solvent proportion was reduced the oil was apt to cling to the benzene, and it was only after prolonged treatment that the last traces were removed.

Industrial Applications

In conclusion, Mr. Pooley referred to the possibility of brine recovery by means of vacuum evaporation, and outlined further possible uses for fish oil. In this connection he said it would no doubt find favour on account of its high vitamin content, a constituent deficient in many vegetable oils. Fish oil went principally to the soap and candle trade, and as its raw price was about half that of tallow, and hardening only added a few pounds to the cost per ton, it thus formed a definite competitor with ordinary tallow. As, however, the manufacture of soap and candles was inseparable from the production of glycerin, it behoved the fish oil manufacturer to give careful attention to the treatment of his material in order to avoid the previous splitting of the oil into fatty acids and glycerin, in which case the latter material was permanently lost.

Anglo-Continental Guano Works

Presiding on July 26 at the annual meeting of the Anglo-Continental Guano Works, Ltd., Mr. J. S. Holmes, M.P., said that with regard to 1922, notwithstanding foreign competition, all their companies had experienced a much better demand than in 1921, and this had enabled them to clear off the whole of their old stocks. They had been able to adjust their prices to something approaching the foreign level, and, if prices remained at all stable during the remainder of the year, as might reasonably be expected, they would hope to find during the autumn and winter a volume of trade which last year was entirely lacking. They had definitely reached the decision and the determination that they would not allow their trade to pass into the hands of manufacturers in other countries. They looked with contempt on such measures of protection as the Safeguarding of Industries Act. For forty-five years the parent business had held premier place in the British fertiliser trade. In its extended and consolidated form it could, and it would, fight and defeat all foreign competition, not by spoon-fed legislation, but by those qualities which developed British industry for two generations before the war, enterprise, economy, circumspection, and perseverance. In conclusion, Mr. Holmes said they had every confidence in the future; they had the trade, they had the men, and, even though conditions might remain difficult for a further period, they had no fear about the increasing and continuous prosperity of the company.

Lever Brothers' Scheme

An Important Co-partnership Development

A FURTHER development in the co-partnership relations of Lever Brothers, Ltd., and their staffs was signalised at a meeting at Port Sunlight on July 27, when Lord Leverhulme announced details of a scheme designed to carry unemployment and life insurance benefits.

Lord Leverhulme said that the last two years of strain and stress had proved that co-partnership was a sheet anchor in such a time. He wanted to develop the principle of co-partnership on certain lines. The schemes were not something instead of wages; they were additional to the standard full trade union rate of wages. They were to reward and encourage intelligence, diligence and efficient service. The schemes were therefore based on the grading of employees throughout the whole factory, that grading to be done in a fair, just and impartial manner.

This new scheme, he continued, was an experiment that the company hoped would be successful. It was hoped that it might never be necessary to discontinue it. But as it was impossible for any company to commit itself for an indefinite period, it must be clearly understood that it was within the discretion of the company, if it found itself unable to continue the scheme or that it was inexpedient to do so, to withdraw it at any time. No money contribution from workers was called for.

Terms of the Scheme

Outlining the provisions of the scheme, Lord Leverhulme said it was intended that it should become operative from October 1 next. The benefits proposed to be given were as follows:—

(1) During any period of suspension from employment arising from any cause such as slackness of trade to which, in the opinion of the company, a co-partner has not either directly or indirectly contributed, the company will pay to such co-partner ex gratia such a sum by way of supplement to the State allowance as, together with that allowance, will yield an amount equal to half the standard weekly rate of wages.

(2) In the event of a co-partner being ill and thereby prevented from working for at least seven consecutive days, and satisfying the company as to the fact, such co-partner will receive ex gratia from the company the same weekly payment for four weeks as he or she would have received for suspension from the causes above mentioned. After the expiry of four weeks the company will consider whether or not such benefit should be continued for any further period.

(3) Each co-partner will be presented ex gratia with a policy of life assurance of the minimum amount of £100, with one year's premium paid thereon. The intention of the company is to pay the subsequent annual premium on each such policy, and the company may from time to time increase the amount of such policy and issue an additional policy or policies as they may determine, but so that the total amount of assurance taken out for any single co-partner shall not exceed in the case of the staff the sum of £1,000, in the case of forewomen and foremen £2,000, and in the case of the management and directorate the sum of £4,000.

(4) In the case of an assured, with the consent of the company, retiring from active employment, the company will make every effort to arrange with the insurance company that the company may continue to pay the premiums on the total sum assured.

(5) The company will make every effort to arrange with the insurance company that in the event of an assured becoming totally incapacitated from work by illness or other like cause, that the insurance company will pay the amount assured as if the assured had died instead of becoming totally incapacitated.

The company will also make every effort to arrange with the insurance company that, in the event of an assured's employment ceasing with the company for any reason, the assured will be able to continue his assurance if he so desires by payment of the insurance company's ordinary table rates of premiums without medical examination.

Nothing in this scheme is to affect the company's rights under the contract of employment with an employee, or its rights of suspension or dismissal.

The foregoing benefits are offered voluntarily by the company, no monetary contribution being required to be made by the employee, and the company shall be at liberty at any time in its discretion either to continue the benefits wholly or partially, or to alter or reduce them, or to suspend or entirely withdraw them, and no participant shall have any right of action in law against the company in respect of the benefit, which shall not form in any way a donation or term of employment.

The scheme above outlined is subject to consideration by the company's legal advisers and to the preparation of proper legal documents.

Mr. C. W. Barnish, chairman of the Port Sunlight Management Committee, described the scheme as one of the most far-sighted proposals ever outlined, and one of the most generous ever put before an industrial community. He reminded them that the co-partnership dividends paid last year by the firm amounted to a sum of over £208,000.

British Broken Hill Proprietary

Company's Operations and the Edmunds Award

IN his speech at the annual meeting of the British Broken Hill Proprietary Co., Ltd., held last week at Winchester House, Old Broad Street, London, the chairman (Mr. W. H. Woodhead) dealt at some length with the dispute between the company and the Broken Hill Associated Smelters Proprietary, Ltd. Reviewing the incidents leading up to this, the chairman explained that in 1915 two of the principal Broken Hill mining companies—the Broken Hill South, Ltd., and the North Broken Hill, Ltd., entered into an agreement with the Broken Hill Proprietary Co., Ltd., for the purchase of its smelting and refinery works situated at Port Pirie, South Australia. A new company was formed, called the Broken Hill Associated Smelters Proprietary, Ltd., in which the Broken Hill Proprietary Co. took an interest as part of the purchase consideration. Thus, these three companies entered into a partnership, and subscribed to an agreement for the smelting, refining, and realisation of their products. They had equal representation on the board of the new company, whose head office was established in Melbourne, and later an office in London was opened. Soon after the inauguration of this new smelting company, another of the Broken Hill mining companies, the Zinc Corporation, Ltd., joined and subscribed £100,000 share interest.

In May, 1916, he continued, the British Board of Trade, acting under statutory authority then just passed, cancelled all contracts with enemy subjects and made it possible for their company to consider ways and means of dealing with its mine products. About this time sales and shipments of lead concentrates were being made by the company to Japan, and negotiations were pending for an extended contract, when the Commonwealth Government placed an embargo on export even to the United Kingdom or an allied country. Permission to export was refused, the Government indicating that their ores and concentrates would have to be smelted in Australia. Thus they were thrown back on "the Smelters," whose works were the only works available at the time capable of dealing with their output. The terms offered by "the Smelters" were such that after the most careful consideration of their contract and the constitution of their company, and after protesting in every possible manner against those terms without avail, they again approached the Commonwealth Government with a view to obtaining a declaration that the embargo on export was only a war-time measure; this was refused, and they had to bow to the inevitable and sign "the Smelters'" contract as it stood. The alternative was, of course, for the mine to remain idle—an unthinkable proposition. Thus they were forced into the acceptance of a contract which, however profitable at the time, owing to the abnormal prices of metals, they foresaw would seriously affect the company when metals fell to normal.

There were, continued Mr. Woodhead, two matters which must be set right if the company were to prosper; The one was revision of the Edmunds Award, and the other was the contract with the Broken Hill Associated Smelters. The first would, he hoped, be considered in the New South Wales Industrial Arbitration Court at an early date, and their representatives on the other side would do all that was possible, in conjunction with the other Broken Hill companies, to further the case of the mining interests involved.

The continuation of the contract with "the Smelters" under existing conditions served only to hamper and restrict the company's operations.

The Capture of Europe

By Sir Ernest J. P. Benn, Bart.

THE business man who will make a study of the matter will come to the conclusion that Europe to-day presents the biggest and most promising market ever known to mankind. The big fact about the European situation is that at long last the politicians are going to a discount, and the world is awakening to the obvious fact that reconstruction is a job for the business man. The impossibility of altering the normal course of economical development by political action is now fully understood and we are getting back to the good old-fashioned position when we used to realise that there was no connection between politics and business.

Trading Possibilities in Europe

The possibilities of Europe as a market are practically unlimited. We are gradually awakening to the fact, and the full awakening which is now practically due involves two further points. We have first of all to inquire whether we are really fully alive to the meaning of the word "market." The ignorance in England and in America, of the real conditions of Central Europe is appalling, but that is a difficulty which will gradually right itself as our people slowly permeate into these delightful parts. We have then to ask ourselves what we know of "markets." We talk to-day of difficulties which would have made our fathers smile, we decline to take risks which are insignificant beside those which were common with our grandfathers, we look to other people to arrange our business for us, and until everything is clear and straightforward we are inclined to remain inactive.

Taking a very broad view of Europe, one first of all notices that it consists of nearly one thousand millions of human souls, all of whom have for the past seven or eight years had "Homes for Heroes" dinned into their ears. It must not be forgotten that "Homes for Heroes" was translated into every living language, and that all the nations who took part in Armageddon were actuated by the belief that by so doing they would improve their social and economic conditions. Every man, woman, and child in Europe, therefore, to-day is looking for "Homes for Heroes," that phrase being translated into the language of business, meaning everything which one sees in the shop windows, from a grand piano to a toothpick.

New Conditions

One or two points may here be usefully mentioned in order to clear up common misapprehension. It must not be forgotten that we are faced in several ways with conditions which are quite new, conditions which we do not understand, and conditions to which old theories are not necessarily applicable. For instance, the economists are never tired of telling us that a depreciated exchange makes it difficult for the people affected to buy abroad. The fall of the mark is supposed to prevent the importation into Germany of raw materials from other countries. It is questionable whether this is wholly true; it can at least be said with certainty that there is a point in the process of the depreciation of a currency when it has the effect of creating a very active market. That point has arisen in Austria; the people of Austria have not unnaturally lost all confidence in their currency. The workman who now gets the pre-war equivalent of £5,000 a week is very anxious when he receives his wages to turn them into real value; he knows from bitter experience that if he holds or saves his crowns they may be liable to assume a very much smaller value in a few weeks' time.

It is impossible to fail to admire the wonderful ability of some of the peoples in Central Europe, in the way in which they have adapted themselves to a fluctuating currency. The Austrians have reached a point when all their prices change from day to day with the changing values of the kronen. A month ago, in pre-war values, a postage stamp cost £7 10s., the normal tip to a railway porter was a £50 note, and the wages of a postman were nearly £5,000 a week. Our newspapers make a good deal of unnecessary fuss about this situation and lead the English public to imagine that it is very much worse than is really the case. All that has happened in Austria in effect is that they have treated themselves to an overdose of what we should call here currency reform. The Austrians suffer certain inconveniences, they may be heading for a crash, although that has yet to be seen; but meantime they live and get on the whole about as much out of life as the rest of us, and in addition have acquired a facility for dealing with the intricacies of arbitrage which cannot fail to improve their mental faculty.

New Commercial Relations

Looking at Europe as a whole, from the geographical point of view, it consists of thirty sovereign States, of which practically a dozen are new. This is a fact full of commercial importance. Nationality to the Pole or the Czecho-Slovak is at present little more than a matter of treaty; these new people brimful of new nationalism are all anxious to establish new connections; if they go back to their old commercial connections as Germans or Russians, their new national pride misses much of its natural satisfaction. This is an important new psychological factor, acting in a dozen countries, and full of opportunities for the English and the American trader.

The politicians would have us suppose that trade with Russia is an impossibility; we are invited to believe that until the Supreme Council has come to an understanding with the Government of Russia, no commerce with that country is possible. This, of course, is in the main true, but it does not alter the fact that ever since hostilities ceased there has been an ever-growing volume of trade between Russia and Central Europe. As a matter of fact, in the new States on the border line of Russia are to be found thousands of traders, who, notwithstanding regulations, have succeeded in carrying on their business with that great country.

Export of Capital

There is another very big consideration which supports the contention that Europe is the market of the immediate future. Before the war England was the happy possessor of four thousand million sterling of foreign investments, during the war it was necessary for us to sell more than half of our overseas holding of capital; at the present moment our foreign investments are estimated to be worth one thousand eight hundred million sterling. Our pre-war position as a heavy creditor of the rest of the world was responsible for the standard of living in these islands; it brought us cheap food, it enabled us to import freely from every corner of the earth, it made us the market of the world, and it was the basis of our predominant commercial position. If we are to regain the standard of life which we enjoyed before the war we must, of necessity, re-export the two odd thousand millions of capital which we lost during the war. A study of the possibilities of the world as a whole point unmistakably to Europe as the home of this new capital. There can be no doubt that before another generation arrives we shall have put our balance sheet right by the export of a great deal of capital, and that most of that commodity will have found its way to Europe. The fact that Europe wants it and the rest of the world does not, makes further argument unnecessary, and enables us to draw the conclusion that the movements of British export in the next few years will be to the Continent. This is a subject which is worthy of the most careful consideration at the hands of our industrialists generally.

The successes of those who have ventured into Central Europe are beginning to be known, and others are following. Each week sees more and more English business men crossing the Channel and making their way east, and it is safe to say that the great majority of those who go out to investigate and inquire come back full of enthusiasm for the new possibilities that now present themselves.

As we have already said, Europe is no place for the business man who requires his business to be done for him before he starts. Orders cannot be picked up in Europe on the same lines as were common in Whitehall from 1914 to 1918, business can only be done by those who understand business, by those who realise the necessity for initiative and enterprise, by those who are prepared to make the necessary preliminary investigations, by those who are prepared to adapt themselves to the exceptional circumstances of the time. This does not mean risk, it does not mean credit, it does not, above all, mean gambling on exchanges, it simply means common sense, and work and effort, qualities in which we are all agreed we are badly lacking in these times. But times are altering, economic depression and unemployment are teaching us their lesson, and once again we are beginning to realise the necessities of the situation. Europe presents to-day great opportunities of which there is no doubt that we shall take full advantage.

Leeds Chemical Works Explosion

Burst Pre-heater Still

THE chemical works of Brotherton and Co., Ltd., Holmes Street, Dewsbury Road, Leeds, was the scene, on Monday, of a violent explosion, due to the bursting of a large pre-heater still used in the manufacture of ammonia from gas liquor. Two men (James Gibbin, stillman, and Arthur Taylor, limeman) who were working near the still died within a short time from injuries sustained in the explosion, while three other men were slightly injured.

The tank, which was entirely wrecked, occupied a central position in the works yard, and was about 20 ft. high with a diameter of 7½ ft. The cause of the explosion is not yet known, and it has been suggested that the cause may have been the failure of the safety valve to operate, or the mis-reading of the pressure gauges. The explosion occurred at 7.30 a.m., and heavy fragments of metal were blown in all directions, one piece piercing a gasholder at the Leeds Corporation Gasworks.

Interviewed by a Press representative, Mr. Charles Ratcliffe, a director of the company, said the still in question had worked satisfactorily for many years, and it was carefully examined by the manager, Mr. Blackburn, on Saturday, in anticipation of operations re-starting on Monday. It was essential to get the works going as rapidly as possible, he said, as the firm was under contract with the Leeds Corporation to clear all its gas liquor.

The inquest on the victims was opened by the Leeds City Coroner on Wednesday, and was adjourned until Wednesday, August 16. Mr. Ratcliffe, on behalf of Sir Edward Brotherton and his co-directors, extended his sympathy to the relatives. Gibbin, he said, had been with the firm for 35 years, and was a valued employee. Taylor, too, had proved himself a capable workman.

Sodium Hydrosulphite

Reliable Method for Quantitative Estimation

SODIUM hydrosulphite has now become of such importance in industries requiring a powerful bleaching agent that the publication by Brotherton and Co., Ltd., of a reliable method for quantitatively determining it is of considerable interest to the industrial chemist. Entitled "Hydros: Methods of Quantitative Estimation," the booklet describes in some detail the methods employed at the company's Port Rainbow factory, and we understand that copies are obtainable gratis by firms using hydrosulphites on application to the company's offices at City Chambers, Leeds.

The indigo carmine method is customarily employed in the company's laboratories, and the booklet gives full details relating to the preparation of pure indigo, the preparation of standard indigo carmine solution, the preparation of "hydros" solution for analysis, the technique of the method of analysis, and a description, with diagram, of the apparatus used. An interesting table of results illustrates the accuracy of this method.

In the silver method, which is also described, about 0·4 gram of "Hydros" is accurately weighed out in a carefully dried stoppered weighing bottle. A silver solution is prepared by dissolving one gram of silver nitrate in 10 c.c. of distilled water and adding 15 c.c. of 20 per cent. ammonia. This solution is poured on to the solid "Hydros," and the reacting substances are well mixed together with a thin glass rod. After about five minutes the grey precipitate of silver is filtered off, washed thoroughly with dilute ammonium nitrate solution until free from silver nitrate, dried, ignited and weighed in the usual way. The silver may also be dissolved in dilute nitric acid, and estimated with standard thiocyanate; 216 parts of silver are equivalent to 174 parts of pure anhydrous sodium hydrosulphite.

Iron and Steel Institute

THE autumn meeting of the Iron and Steel Institute will be held at York on September 5-8, when it is expected that ten papers will be submitted for discussion. In addition to an excursion to Rievaulx Abbey and Castle Howard, visits have been arranged, with special trains, to the works of the Staveley Coal and Iron Company, near Chesterfield, and of the Parkgate Iron and Steel Company at Rotherham.

English Oilfields Progress

Report on Tests of New Processes

IN an interim report to shareholders on the progress of investigations and experimental work undertaken, the directors of English Oilfields, Ltd., state that speaking generally, the question of retorting the shale is not one that presents any serious difficulty, but it was hoped at the time of the last general meeting that a new system of retorting, which it had been decided to test, would serve the double purpose of carbonising the shale and eliminating the sulphur from the oil. It is a matter of disappointment that so far as these tests have yet gone, the latter result has not been accomplished; they are, however, to be continued.

Concurrently with the tests just referred to, others of an entirely different character have been, and are being carried out, with the object of eliminating or reducing the sulphur, after and not during the retorting process—but it is too early yet to predict with any confidence definite results. A great deal of useful information, both positive and negative, has been collected.

The report points out that the elimination of the sulphur from the oil products, either during or after the retorting process, is important, principally because its presence depreciates the selling value of such products. It will, therefore, be readily appreciated that if (notwithstanding the sulphur) the by-products from the process of retorting can be so utilised as to offset this depreciation in value, it is of the greatest consequence that no efforts should be spared to accomplish this object.

Ramsay Memorial Fellowship

THE Ramsay Memorial Fellowship trustees have awarded a Ramsay Fellowship of the value of £300, tenable for one year, but renewable for a second year, to Mr. Robert Winstanley Lunt, Ph.D., of the University of Liverpool and of University College, London. Mr. Lunt will continue to undertake chemical research at University College, London, on chemical effects of electromagnetic waves over the frequency range 10.5—10.8 cycles. The trustees have awarded the Glasgow Ramsay Fellowship of £300 to Mr. John Alexander Mair, B.Sc., of Glasgow University, who will continue his reaseach on the chemistry of the terpenes. The trustees have also granted a special Fellowship of £300 for one year to Mr. William Davies, M.Sc., who has already held a Ramsay Fellowship for two sessions, and whose work, especially that on the preparation of synthetic reagents from the toluic acids, shows special promise. The Danish Ramsay Fellowship has been awarded to Mr. Kristian Höejendahl, of the University of Copenhagen, who will pursue his research in the University of Liverpool. Two Swedish Ramsay Fellowships have been awarded to Dr. J. O. G. Lublin and Mr. A. W. Bernton respectively. Two Norwegian Ramsay Fellowships have been awarded to Mr. Dag Nickelsen, who will work at the Imperial College of Science and Technology, and Miss Milda Pryz, who will work at University College, London. The trustees have placed at the disposal of the National Research Council of the United States of America a special Ramsay Fellowship of the value of £350; and Dr. Charles S. Piggot, of Baltimore, has been elected to that Fellowship, and will begin work at University College, London, in October.

Cast-Iron Research

FURTHER investigations of a varied character have been carried out on behalf of the members of the British Cast Iron Research Association, most of them being of general interest and importance, and providing valuable data in connection with the larger research works which are being carried out by the director. The work on draws and shrinkages, moulding sands and refractories, internal combustion engine cylinder castings, and methods of testing cast iron is being pushed forward, and a special committee has been appointed to carry out a thorough investigation in connection with malleable iron castings with the view of broadening out the use of this class of casting. The first bulletin, giving full details of the researches already carried out, is now being issued to the members, and subsquent issues will be made as the work progresses. In connection with the research on refractories, which is being carried out in conjunction with the British Refractories Research Association, this will include blast-furnace linings.

Chemical Matters in Parliament

Avonmouth Smelting Works

MR. YOUNG, in reply to Mr. D. Davies (House of Commons, July 31), said that the Avonmouth Smelting Works, which did not belong to the Government, had not been sold.

Distinctive Colours for Poisons

Mr. Shortt informed Sir F. Flannery (House of Commons, July 31) that inquiries were being made as to the practicability of employing distinctive colours for poisons, but the investigation was not yet complete.

Insecticides

Replying to Major Barnett (House of Commons, July 31), Sir J. Gilmore said the insecticide used on the roof of Westminster Hall was a mixed solution of orthopara-dichlorbenzene; good results were obtained as a result of its use.

Reports of Committees

Mr. Kiley was informed by Sir P. Lloyd-Greame (House of Commons, July 31) that he had not yet received the reports of the Committees under the Safeguarding of Industries Act in respect of scientific and optical instruments, gas mantles and glass bottles.

Oil Coke

In reply to Sir F. Flannery (House of Commons, July 28) Mr. Amery said that oil coke, which was the residue after distillation of oil fuel, etc., from crude oil, was unsuitable for use in His Majesty's ships, and none had been used or purchased during the last twelve months.

Australian Zinc Concentrates

Answering Mr. D. Davies (House of Commons, July 31), Sir W. Mitchell-Thomson said he was advised that, having regard to the state of the spelter market, the present would be an inopportune time to raise any question with the Australian producers of determining the contracts for future deliveries of Australian zinc concentrates.

Lead and Spelter Stocks

Replying to Mr. D. Davies (House of Commons, July 31), Mr. Bridgeman said the stocks of pig lead in the metal exchange warehouses of this country on June 30, 1922, amounted to 268 tons, and of refined and good ordinary brand spelters to 4,662 tons, including stocks of spelter in the hands of H.M. Government. These quantities were in addition to stocks of lead and spelter in the possession of individual firms. He regretted that similar information with respect to August, 1914, was not available.

Imports of Glassware

Replying to Mr. Galbraith (House of Commons, July 28), Sir P. Lloyd-Greame submitted a statement which showed that in 1920, 1921, and the first half of 1922 our imports of specific glassware (except tubing and rod) from all sources were valued at £139,407, £161,857 and £32,558 respectively. The imports from Germany were £79,615, £75,455 and £24,954. The values of tubing and rod from all sources were £70,792, £30,829 and £8,661, while Germany's contributions amounted to £10,211, £9,375 and £4,639, respectively.

Macedonian Oil Concessions

Lieut.-Commander Kenworthy (House of Commons, August 2) asked whether the Anglo-Persian Oil Co. had negotiated the exclusive rights to drill for oil over the whole of Macedonia; whether the concession included the oil rights in Thrace; and whether diplomatic support was given to the Anglo-Persian Oil Co. in negotiating this concession.

Mr. Harmsworth said the answer to the first part of the question was in the affirmative and to the second part in the negative. H.M. Government had afforded to the Anglo-Persian Oil Co. in their negotiations with Greece the usual support which was always given to reputable British firms in their negotiations with foreign Governments. His information was that no concessions had been discussed or arranged in connection with any part of Thrace.

Production of Benzole

Mr. Kiley (House of Commons, July 28) asked the President of the Board of Trade whether he could state how many gallons of benzole were produced in the United Kingdom during the last 12 months.

Sir P. Lloyd-Greame said he had been unable to secure information showing the production of benzole in the United Kingdom for the twelve months ended June, 1922. During the calendar year 1921, the National Benzole Association estimated that the quantity produced by the members of the Association was approximately 9,000,000 gallons, and the output by non-members was believed to be about a quarter of that of members. Owing to the stoppage in the coal-mining industry, the production of benzole in 1921 was greatly reduced, and, according to information furnished to him, the present normal output was at about double the rate estimated for 1921.

Price of Lime Green

Replying to Lieut.-Commander Kenworthy (House of Commons, July 31), Sir P. Lloyd-Greame said the President of the Board of Trade had received a letter from the National Federation of Paint, Varnish, and Colour Manufacturers, which stated that while the German prices for the cheaper grades of lime green were about one-half the price of equal grades of British make, the price difference diminished as the quality improved until for the highest grade the British and German prices closely approximated. The same Federation had also informed the Licensing Committee that the difference in price was of no material importance in its effect upon the cost of production of the finished goods into which lime green entered, and in view of this he did not propose to ask the Committee to reconsider their decision in regard to the issue of licenses to import this commodity, which was reached after exhaustive inquiry into the whole matter.

Sodium Bromide

Mr. Raffan (House of Commons, July 31) asked the President of the Board of Trade if he was aware that a consignment of sedobrol, containing a percentage of sodium bromide, which was scheduled as a dutiable product under Part I. of the Safeguarding of Industries Act, 1921, was held up by the Customs authorities at the port of entry for about three weeks on account of that Department refusing to accept the importers' declaration that the value of the sodium bromide was 6d. per lb. and demanding invoices in support of such declaration; and that, as this was a made-up or patent medicine, it was quite impossible for the importers to produce such documents; and would he take steps to avoid such heavy delay in clearing goods, part of which might be liable to key duty.

Mr. Hilton Young said that if Mr. Raffan would furnish him with particulars which would enable the importation referred to to be identified he would cause inquiries to be made.

Metalliferous Mines

Answering Mr. D. Davies (House of Commons, July 31), Mr. Bridgeman said the number of men, women and boys employed in 1875, 1895 and 1920 at mines coming under the Metalliferous Mines Regulation Act, 1872 (namely, all mines other than mines of coal, stratified ironstone, shale or fireclay) were as follows:—

Year.	Men.	Boys.	Women and Girls.
1875	46,852	7,418	3,803
1895	30,153	2,421	799
1920	20,510	599	214

The tonnages of dressed lead and zinc ores produced in the United Kingdom in those years were:—

Year.	Lead Ore.	Zinc Ore.
1875	77,746	23,978
1895	38,412	17,478
1920	15,399	5,064

Sodium Hyposulphite

Sir P. Lloyd-Greame informed Mr. Foot (House of Commons, July 31) that the degree of purity was not the only test as to whether a chemical was or was not included within the scope of Part I of the Safeguarding of Industries Act, as was clearly indicated by the Referee in the case of sodium hyposulphite. He had no reason to think that the list in its present form now gave rise to any appreciable difficulties. There were many tests, as had been shown by the Referee in his judgment of what constituted a fine chemical.

Replying to a further question by Mr. C. White, Sir Philip said the sample of sodium hyposulphite submitted at the hearing by the Referee was put to witnesses for the complainants in cross-examination by counsel appearing on behalf of a manufacturing company which was allowed by the Referee to appear in opposition to the complaint, and not by the Board of Trade. He was unable to say from what source this sample was obtained.

Central Importing Agency

Mr. Galbraith (House of Commons, July 31) asked the President of the Board of Trade whether any arrangements were being made or contemplated whereby all profits made by the Central Importing Agency out of the sales of German reparation dyestuffs on behalf of the Government were to be handed over to British dye-makers.

Sir P. Lloyd-Greame said that no arrangements of the kind suggested had been made. Certain proposals for the assistance of the dye-making industry, as a whole, by the further co-operation of the dye users and the State, had, however, been tentatively put before the President of the Board of Trade, and he was in consultation with the Chancellor of the Exchequer on the subject. In reply to Lieut.-Commander Kenworthy, who asked whether they might take it that no German reparation payments would be handed over to the British dye-makers before the consent of the House was obtained, Sir P. Lloyd-Greame said it was undesirable and quite impracticable to go into this question now when the matter was on the basis only of tentative negotiations.

Analytical Reagents

Mr. Hogge (House of Commons, July 31) asked the President of the Board of Trade whether he was aware that, by the use of the words "analytical reagents" in the Safeguarding of Industries Act, certain heavy chemicals never intended to be taxed had to be taxed because they were used in comparatively minute quantities as analytical reagents; that, in consequence, such a heavy chemical as hyposulphite of soda was taxed because a few hundred pounds, as compared with every 1,000 tons used industrially, was used as an analytical reagent; whether he was in sympathy with this unexpected result of the Act; and, if not, what steps, if any, he proposed to take?

Sir P. Lloyd-Greame said that such heavy chemicals as were prepared in a very high degree of purity for use as analytical reagents were liable to duty only when of analytical reagent or correspondingly special quality. With regard to the second part of the question, hyposulphite of soda of the ordinary industrial grade was not liable to duty, but only the photographic quality. This was not an unexpected result of the Act, and consequently he did not propose to take any action in the matter.

Palm Oil Exports

Replying to Major Barnes (House of Commons, August 1), Mr. Churchill said that export duties on palm kernels and palm oil were imposed in Sierra Leone for the first time in January, 1918, and had since been varied at different dates, the last changes being in the case of palm kernels in September, 1921, when the duty was raised from 10s. to £1 per ton, and in the case of palm oil in February of this year, when the duty was reduced from £4 3s. 4d. to £1 0s. 10d. per ton. The export of palm oil averaged 2,196 tons a year for the five years preceding 1918, and had since been as follows:—1918, 1,085 tons; 1919, 3,453 tons; 1920, 2,066 tons; 1921, 191 tons; 1922 (January-May), 820 tons. This fall in value gradually, but in the end completely, stopped the trade. After April, 1921, prices rose gradually, but the export duty of £4 3s. 4d. a ton, together with the difficulty, which necessarily existed in bringing trade back into deserted channels, and the poor demand in England, delayed any revival of the trade in Sierra Leone. The gradually improving conditions and the reduction of the duty were having a stimulating effect this year, and the export was steadily improving. In these circumstances there was no idea of remitting the tax further at present.

Sodium Pyrophosphate

Mr. Kiley (House of Commons, July 31) asked the President of the Board of Trade if he was aware that one of the largest makers of patent food products, employing a considerable number of hands, who were large consumers of sodium pyrophosphate (cream of tartar substitute), a product scheduled in the key list under Part I of the Safeguarding of Industries Act, 1921, were unable to meet competition for export business of foreign makers of similar products who obtained this raw material free of any duty, and were also handicapped in the home market by competitive firms consuming cream of tartar, a similar product which had been taken out of the key list by order of the Referee, and in consequence had had to curtail their output and discharge a large number of workmen; and, if so, how much longer was it intended to levy duty on the imports of sodium pyrophosphate and hundreds of other articles which, on the Referee's rulings on points of principle, were clearly outside the scope of Part I of the Act.

Sir P. Lloyd-Greame said that no representations had been made to him that the action taken by the Board of Trade on the decision of the Referee in the case mentioned had had any effect on the export trade of any company, or had curtailed output and caused unemployment. As regards the last part of the question, he was not aware of any decisions of the Referee which would warrant the assumption made by Mr. Kiley.

British Dyestuffs Corporation

Rear-Admiral Adair (House of Commons, July 26) asked the President of the Board of Trade whether his attention had been called to an article by Professor H. E. Armstrong on the dyestuff situation, published in the Press on July 24, and, if so, whether he would give favourable consideration to the proposition contained therein that the Government should withdraw its control of, and influence upon, the British Dyestuffs Corporation, Ltd., or, alternatively, insist that the management of the business should be in the hands of technically qualified people.

Sir W. Mitchell-Thomson said he had seen the article. The Government did not control the British Dyestuffs Corporation, and had no influence over its management except in so far as they had a substantial—though not controlling—shareholding interest, and appointed two of the board of directors. He did not think it was expedient that this interest should be withdrawn. As regards the last part of the question, he would refer to the proceedings at the recent general meeting of the Corporation, from which it would be seen that the board of directors had the support of the great majority of the shareholders, and particularly of representatives of important consuming interests. The Corporation undoubtedly had the assistance of scientists and technically qualified men on its management.

U.S.A. and Chemical Warfare

Restricted Manufacture of Poison Gas

THE United States War Department's order for the discontinuance, of the manufacture of poison gas, except in limited amounts for research, and for the development of defence appliances, has already been recorded. The order, signed by General Pershing, is as follows:—In order that the United States may carry out the provision contained in Article V. of the treaty in relation to the use of submarines and noxious gases in warfare, signed February 6, 1922, and ratified by the United States Senate, March 28, 1922, the following limitations will be observed in connection with the procurement, design, research, development and supply of chemical warfare materials as given in Section III, General Orders No. 54, War Department, 1920. The investigation, development procurement, manufacture, or supply of poisonous gases for the present will be limited strictly to the amount necessary for the research and development of gas-defence appliances. The filling of all projectiles and containers with poisonous gas will be discontinued, except for the limited number needed in perfecting gas-defence appliances.

Another modification of existing regulations concerning the training of the army in chemical warfare was provided in another order confirming the use of smoke, incendiary materials and non-toxic gas for training and gas-defence appliances. This order, states *Chemical and Metallurgical Engineering*, directs that there shall be a special service school at which specified officers and non-commissioned officers of the army and the National Guard shall be trained. Provision is made for chemical warfare personnel as instructors in defensive chemical warfare at general service schools, and for representation on the staffs of departments, corps areas, and divisions.

The War Department appropriation bill, which has been passed by Congress and approved by the President, authorises construction work at Edgewood Arsenal to cost $262,000. For administrative expense the Chemical Warfare Service is allowed $17,240 and $600,000 for investigations.

From Week to Week

COLONEL SIR EDWARD ALLEN BROTHERTON, M.P., of Brotherton and Co., Ltd., Leeds, has returned to England from New York.

Arrangements are being made to hold the next ANNUAL MEETING of the Society of Chemical Industry in Cambridge in June next year.

Hope, Graburn and Co., Ltd., 54, Cheapside, Luton, bleachers and dyers, announce that the name of the company has now been changed to WILLIAM H. HOPE (LUTON), LTD.

MR. HOLBROOK GASKELL has joined the board of the United Alkali Co., Ltd., and Mr. J. E. JAMES has been appointed secretary in the place of Mr. E. Mount, who retired recently.

Until recently electro-chemical superintendent to the United Alkali Co., Ltd., Mr. D. A. PRITCHARD has been appointed works manager of the Canadian Salt Co., Windsor, Ontario.

The death occurred on July 26 of MRS. BONE, wife of Professor W. A. Bone, F.R.S. The interment took place on July 29, and was preceded by a service at St. Peter's Church, St. Albans.

According to the *Labour Gazette*, 29,045 workpeople in the AMMUNITION, EXPLOSIVES AND CHEMICAL TRADES were totally unemployed on June 26. Systematic short time workers totalled 2,463.

THE CHEMICAL SOCIETY'S LIBRARY will be closed for stock-taking from Monday, August 7, to Saturday, August 19, and will close each evening at 5 o'clock from Monday, August 21, to Saturday, September 16.

DR. J. W. NICHOLSON, of Balliol College, Oxford, whose marriage with Dr. Dorothy Wrinch, of Girton College, was solemnised on Tuesday, has devoted much of his time to investigations into the structure of the atom.

About 60 lb. of gunpowder at the Hounslow works of Curtis and Harvey exploded on July 27. No fire resulted, and the damage was confined to the mill in which the explosion occurred. It was unoccupied at the time and no one was injured.

It is reported that a NEW POTASH FERTILISER has recently been introduced into Sweden under the name "Electrokali." The material is said to comprise finely-ground slag from the electric-furnace manufacture of ferro-silicon from feldspar and iron turnings.

The British Silk Research Association invites applications before August 1 for the vacant post of RESEARCH CHEMIST in the Association's laboratories at Leeds. Particulars are obtainable from the secretary, at Kingsway House, Kingsway, London, W.C.2.

MR. LIONEL GEORGE ROBINSON, who played a very active part in financing and developing Australian mining and metallurgical industries, and a director of the Broken Hill Associated Smelters, died at Old Buckenham Hall, Norfolk, on July 27, in his fifty-sixth year.

Dr. Howarth, Medical Officer of Health for the City of London, is protesting against the use of SALICYLIC ACID in coffee extract as particularly objectionable, and warns manufacturers that, after this year, its addition will be treated as an adulteration necessitating legal proceedings.

There were THREE FATAL ACCIDENTS in the chemical industry during June. There were three cases of lead poisoning in white and red lead works, and two in paint and colour works. There was one case of epitheliomatous ulceration among operatives in paraffin works and two in pitch factories.

The House of Lords on July 28 unanimously decided that the Amalgamated Society of Carpenters, Cabinetmakers, and Joiners and the General Union of Operative Carpenters and Joiners could not expel members on the ground of their participation in the co-partnership scheme of Lever Brothers, Ltd.

In an interview published in the Paris *Excelsior*, Mr. Edison the American scientist refused to consider the possibility of warding off attacks by hostile aeroplanes, and expressed the opinion that the entire population of London could be asphyxiated by a POISON GAS such as "Lewisite" in the space of three hours.

The curators of the DIXON CHAIR OF MINING at Glasgow University met on July 28 for the purpose of considering what steps should be taken to appoint a professor. After a careful examination of the position, the curators adjourned the meeting until September in order that further inquiries should be made before proceeding to an appointment.

THE DHARAMSI MORAJI CHEMICAL CO. has built a sulphuric acid plant of 7,500 tons per annum capacity. This is the largest plant of its kind in India. It is reported that the factory will also manufacture superphosphates and the results are being watched with the greatest interest. This factory is one of the first built in the new Ambernath area on the G.I.P. Railway.

At a recent meeting of the Castleford Urban District Council, a complaint was made in regard to CHEMICAL FUMES AND GASES from several works in the district which were alleged to be contaminating the atmosphere, and the sanitary inspector was instructed to have the nuisance remedied, and, if necessary, to call the special attention of the Ministry of Health to the matter.

Speaking at the Conference of the British Dental Association at Newcastle-on-Tyne, on Tuesday, Mr. J. T. Jameson, alluding to the great increase in caries of the teeth, said that this seemed to coincide with the production of the less pure form of prepared sugar, and it might be that the natural product was so changed by its CHEMICAL TREATMENT that it lost some essential and vital element.

Addressing the Section of Industrial Diseases and Forensic Medicine at the annual conference of the British Medical Association, Sir W. H. Wilcox discussed the dangers to health of INDUSTRIAL PREPARATIONS OF ARSENIC. Arsenious oxide and arsenic wood preservatives and sheep dips were dealt with in detail and the section later passed a resolution recommending restrictions on the sale of preparations containing arsenic.

Mr. D. A. GREENWOOD, director of A. Taylor and Co., Ltd., mining material merchants, 21-24, Bettelheim Buildings, Simmonds and Fox Streets, Johannesburg, left Capetown for England on July 14 by the s.s. *Kildonan Castle*. He is interested in new agencies, particularly for mining materials, asphalte, and municipal machinery, etc., and, on arrival, may be addressed, c/o Immediate Transportation Co., Ltd., 33, St. Mary-at-Hill, Eastcheap, London.

DR. GEORGE SENTER, F.I.C., Principal and Head of the Department of Chemistry, Birkbeck College, has been selected by the University of London Graduates' Association as candidate for the vacancy in the representation of Science Graduates on the Senate of the University of London, caused by the election of Dr. Walmsley to the Chairmanship of Convocation. Dr. Senter was formerly a member of the Senate, and has for many years taken an active part in University affairs.

VARIOUS EXHIBITS OF CHEMICALS were on view in the Kelvin Hall, Glasgow, during the meetings of the British Medical Association. The British Dyestuffs Corporation, Ltd., had an interesting display of samples of their dyes. The Jeyes Sanitary Compounds Co., London, had an exhibit of their products, including soaps. The Cromessol Company, of Glasgow, staged disinfectants, and Archibald H. Hamilton and Co., Ltd., Glasgow, had on view samples of "Shell" bronze floor polish.

The first report of the ADHESIVES RESEARCH COMMITTEE has been published by the Stationery Office. It embodies the results of certain of the investigations initiated by the Adhesives Committee of the Conjoint Board of Scientific Societies and also the researches of a more fundamental character which have been undertaken by the Adhesives Research Committee of the Department of Scientific and Industrial Research. It is thus a comprehensive summary of the work from its inception in 1918 up to the end of 1921.

That liquefied methane, hydrocarbons, can be used for many industrial purposes, was recently pointed out by J. Bronn at a meeting of the Institute of German Chemists. The first plant where LIQUEFIED METHANE is generated on a commercial scale has been installed this year. The liquefied gas is at a pressure of 150 atmos., kept in the usual steel bottles from which it is derived by means of the familiar reduction valves. One of the uses for which methane is said to be admirably suited is the welding of copper, brass, and aluminium, the oxygen flame of the gas being milder and softer than that of any other welding gas. Methane is also used on an ever increasing scale for the autogenous cutting of iron.

References to Current Literature

British Dominions

PIGMENTS.—The manufacture and use of black pigments. Part I. H. L. Blachford. *Canad. Chem. and Met.*, July, 1922, pp. 156-158.

SEWAGE TREATMENT.—The relation between gas evolved and the digestion of sewage in activated sludge. G. H. W. Lucas. *Canad. Chem. and Met.*, July, 1922, pp. 148-151.

ANALYSIS.—The determination of arsenic in cobalt ores and cobalt nickel speiss by the distillation method. C. A. Knittel. *Canad. Chem. and Met.*, July, 1922, pp. 146-147.

REACTIONS.—The action of several salt solutions on aluminium, copper, lead and zinc. C. H. Crowe. *Canad. Chem. and Met.*, July, 1922, pp. 151-152.

United States

PETROLEUM.—The sulphuric acid treatment of petroleum products. C. J. Von Bibra. *Chem. and Met. Eng.*, July 12. 1922, pp. 66-72.

OXIDATION.—Mechanism of metallic oxidation at high temperatures. N. B. Pilling and R. E. Bedworth. *Chem. and Met. Eng.*, July 12, 1922, pp. 72-74.

FUEL.—Heating coke ovens with blue water gas. J. F. O'Malley. *Chem. and Met. Eng.*, July 12, 1922, pp. 75-78.

GENERAL.—An informational service for a chemical manufacturing concern. D. B. Keyes. *Chem. and Met. Eng.*, July 12, 1922, pp. 54-58.

REACTIONS.—The action of hydroxylamine and of hydrazine on the aryl monothioamides of ethyl acetomalonate. D. E. Worrall. *J. Amer. Chem. Soc.*, July, 1922, pp. 1551-1557.

HETEROCYCLIC COMPOUNDS.—Researches on thiazoles. Part II. 2-*p*-Tolyl-benzothiazole, dehydrothio-*p*-toluidine, and some related compounds. M. T. Bogert and M. Meyer. *J. Amer. Chem. Soc.*, July, 1922, pp. 1568-1572.

Constitution of the so-called dithio-urazole of Martin Freund. Parts I. and II. P. C. Guha. *J. Amer. Chem. Soc.*, July, 1922, pp. 1502-1517.

ESTERS.—Some derivatives of carbamic esters. Chlorine as a simultaneous oxidising and condensing agent. R. L. Datta and B. C. Chatterjee. *J. Amer. Chem. Soc.*, July, 1922, pp. 1538-1543.

ANALYSIS.—Determination of small amounts of molybdenum in tungsten. D. Hall. *J. Amer. Chem. Soc.*, July, 1922, pp. 1462-1465.

Symmetrical diphenyl-guanidine as a standard in acidimetry and alkalimetry. C. A. Carlton. *J. Amer. Chem. Soc.*, July, 1922, pp. 1469-1474.

CERAMICS.—Modern handling methods in the manufacture of electrical porcelain. G. L. Montgomery. *Chem. and Met. Eng.*, July 12, 1922, pp. 59-62.

CATALYSIS.—Ion activities in homogeneous catalysis. The formation of *p*-chloracetanilide from acetylchloroaminobenzene. H. S. Harned and H. Seltz. *J. Amer. Chem. Soc.* July, 1922, pp. 1475-1484.

DYEING.—Mordants. Part II. W. D. Bancroft. *J. Phys. Chem.*, June, 1922, pp. 501-536.

COLLOIDS.—On the coagulation of colloids. A. Westgren and J. Reitstötter. *J. Phys. Chem.*, June, 1922, pp. 537-548.

French

FUEL.—Low-temperature carbonisation. J. H. Frydlender. *Rev. Prod. Chim.*, Part III., June 15, 1922, pp. 361-366; Part IV., June 30, 1922, pp. 397-403.

RESINATES.—Resinates and their applications. Part I. M. de Keghel. *Rev. Prod. Chim.*, July 15, 1922, pp. 433-436.

ACIDS.—The industry of the sulphonic acids of naphthalene and its derivatives. *La Technique Moderne*, July, 1922, pp. 307-314.

DIAZO COMPOUNDS.—Diazo compounds. Part IV. E. Noelting. *Rev. gén. des Matières Colorantes*, June, 1922, pp. 84-88.

SOAP.—Solutions and sols; detergent action of soap. Part IV. C. Gillet. *Rev. gén. des Matières Colorantes*, June, 1922, pp. 88-93.

FATS, OILS.—The chemistry of fatty bodies. E. André. *Bull. Soc. Chim.*, June, 1922, pp. 459-525.

The catalytic decomposition of avachis oil. A. Mailhe. *Bull. Soc. Chim.*, June, 1922, pp. 459-525.

CALCIUM COMPOUNDS.—The study of calcium-ammonium. E. Botolfsen. *Bull. Soc. Chim.*, June, 1922, pp. 561-567.

ANALYSIS.—The inversion of saccharose in alkaline copper solution. E. Canals. *Bull. Soc. Chim.*, June, 1922, pp. 583-588.

German

CATALYSIS.—The catalytic decomposition of formic acid. E. Müller. *Z. Elektrochem.*, July, 1922, pp. 307-310.

Catalytic hydrogenation under pressure in the presence of nickel salts. Part I. Indene and acenaphthene. J. v. Braun and G. Kirschbaum. *Ber.*, June 17, 1922, pp. 1680-1686.

AMALGAMS.—The question of the existence of metal compound in the vapour state. A. Eucken and O. Neumann. *Z. Elektrochem*, July, 1922, pp. 322-324.

DYESTUFFS.—Indigoid dyestuffs of the phenanthrene and indene series. P. Friedländer, W. Herzog and G. v. Voss. *Ber.*, June 17, 1922, pp. 1591-1596.

N.N^1-Diphenyl-indigo. P. Friedländer and K. Kunz. *Ber.*, June 17, 1922, pp. 1597-1607.

The colouring matter of *purpura aperta* and *purpura lapillus*. P. Friedländer. *Ber.*, June 17, 1922, pp. 1655-1658.

ELECTRO-CHEMISTRY.—The technical working of lead-containing raw materials by way of lead tetrachloride. A. Nathansohn. *Z. Elektrochem.*, July, 1922, pp. 310-313.

AZIDES.—The decomposition of benzylazide in indifferent media and in malonic ester. T. Curtius and G. Ehrhart. *Ber.*, June 17, 1922, pp. 1559-1571.

The action of sulphurylazide, $N_3SO_2N_3$, on *p*-xylol. T. Curtius and F. Schmidt. *Ber.*, June 17, 1922, pp. 1571-1581.

The action of sulphuryl azide on benzene. F. Schmidt *Ber.*, June 17, 1922, pp. 1581-1583.

ALKYLATION.—Alkylation of amines by means of sulphonic esters. Z. Földi. *Ber.*, June 17, 1922, pp. 1535-1543.

NITRATION.—Tetranitromethane as a nitrating agent. Part II. E. Schmidt, R. Schumacher, W. Bäjen and A. Wagner. *Ber.*, June 17, 1922, pp. 1751-1759.

COLLOIDS.—Amorphous precipitates and crystalline sols. F. Haber. *Ber.*, June 17, 1922, pp. 1717-1733.

A quick dialyser. A. Gutbier, J. Huber and W. Schieber. *Ber.*, June 17, 1922, pp. 1518-1523.

CATECHIN.—Stereoisomeric catechin. Part II. K. Freudenberg, O. Böhme and L. Purrmann. *Ber.*, June 17, 1922, pp. 1734-1747.

WAXES.—The acids of Montan wax. Part II. H. Tropsch and A. Kreutzer. *Brennstoff-Chem.*, July 1, 1922, pp. 193-198.

The production and use of Montan wax. Part II. Dr. Kausch. *Z. Deut. Öl-u. Fett.-Ind.*, June 22, 1922, pp. 394-395.

SOAP SOLUTIONS.—The colloidal properties of soap solutions. Part I. W. Prosch. *Z. Deut. Öl-u. Fett-Ind.*, June 29, 1922, pp. 410-412.

Miscellaneous

ELECTRO-CHEMISTRY.—The cathodic reduction of elementary nitrogen. F. Fichter and R. Suter. *Helv. Chim. Acta*, March 15, 1922, pp. 246-255.

Electrochemical studies in the pyrazole group. F. Fichter and H. de Montmollin. *Helv. Chim. Acta*, March 15, 1922, pp. 256-262.

The electrochemical oxidation of dimethylaniline. F. Fichter and E. Rothenberger. *Helv. Chim. Acta*, March 15, 1922, pp. 166-181.

REACTIONS.—The condensation products of phenyl-hydroxylamine with oxymethylene compounds and carbinols. Part II. Oxymethylenedesoxybenzoïn and phenylhydroxylamine. Part III. Diphenylbrommethane and phenylhydroxylamine. H. Rupe and R. Wittwer. *Helv. Chim. Acta*, March 15, 1922, pp. 205-220.

POLYSACCHARIDES.—Amyloses. P. Karrer and E. Bürklin. *Helv. Chim. Acta*, March 15, 1922, pp. 181-187.

The constitution of diamylose and of cellosan. P. Karre and A. P. Smirnoff. *Helv. Chim. Acta*, March 15, 1922, pp. 187-201.

Patent Literature

Abstracts of Complete Specifications

181,023. Filter Presses. H. O. Traun's Forschungslaboratorium G.m.b.H. Huxter 14, Hamburg 8, Germany. International Convention date, July 5, 1918.

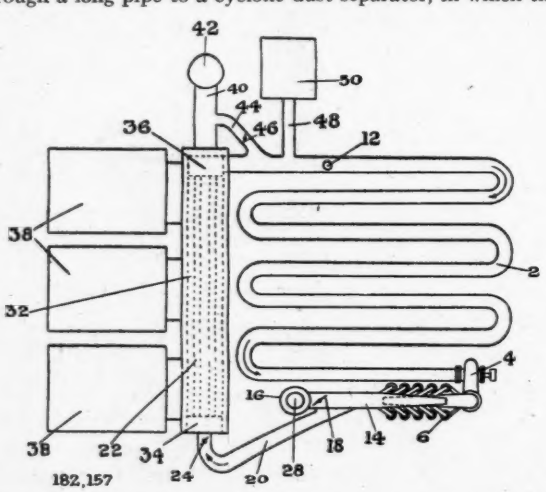
Specification No. 158,134 (see The Chemical Age, Vol. IV., p. 313) describes a filter press in which a series of metal elements are superimposed so that the general direction of the flow of liquid is parallel to the planes of superimposition, but the liquid is constrained to follow tortuous paths at right angles to the general direction of flow. The filter bed is composed of the solid material to be filtered. It is now found that when filtering colloidal precipitates the filter bed should be composed of another permeable material such as gypsum or cement paste, the paste being filtered through the structure and the solid material allowed to settle in the pores.

182,149. Peat, Treatment of. T. Rigby, 72, Victoria Street, Westminster, London, S.W.1. Application date, January 3, 1921.

The process is for removing water from peat as a preliminary to treatment in a film dryer in which the vapour evolved from the wet peat is compressed to raise its temperature and again used for heating the peat. In the preliminary operation the wet peat is supplied to a press in which two continuous wire gauze bands are arranged to travel together, with a layer of peat between them. At one point in their travel the bands are subjected to pressure to express the water from the peat. The layer of peat should not exceed a maximum thickness of ½ in., and the pressure should not be sufficient to extrude the peat. The peat is delivered to the surface drier as a thick pulp, which may be spread over the drying surfaces, but is not sufficiently liquid to be picked up by a rotating drum immersed in it. This drying process may be combined with the process of treatment, which includes the transportation of the peat hydraulically in a large quantity of water and with a minimum of maceration of the peat.

182,157. Drying Peat and other Substances. T. Rigby, 72, Victoria Street, Westminster, London, S.W.1. Application date, February 25, 1921.

The apparatus is for drying peat in a subdivided condition by means of hot flue gases. The powdered peat containing 50 to 70 per cent. of water is dropped into the flue gases travelling at about 60 ft. per second. The dust is carried through a long pipe to a cyclone dust separator, in which the



182,157

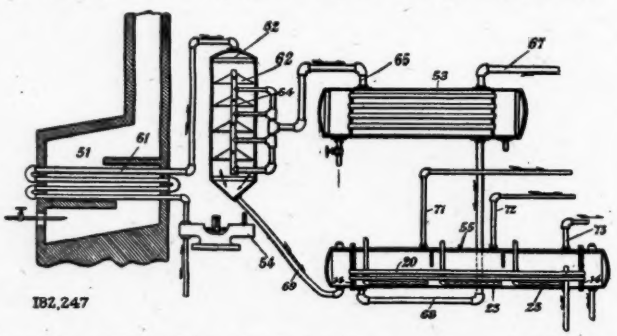
dried particles are separated, giving a yield of about 94 per cent. of the dust. The remaining 6 per cent. is removed by water in washing towers. This dust may be recovered by filtration in the case of wet carbonised peat in which the slimy matter has been destroyed by the earlier treatment. If raw peat is treated by this process the slimy matter has not been destroyed, and the 6 per cent. washed from the gases cannot economically be recovered. With the present apparatus the hot flue gases are returned to the system and these losses are avoided. In the apparatus which is illustrated in plan, the subdivided peat is introduced at 12 into the hot gases which are drawn through the pipe 2 by a fan 4. The gases then pass to a series of cyclone dust separators 6, and then into a pipe 14 having two branches, one leading to a washing tower 16 and the other to a heater 22 comprising a series of heating pipes 32. The pipes are enclosed in a flue through which the hot gases pass from a battery of boilers 38. These gases then pass through a conduit 40 to a stack 42, but some may be diverted through a pipe 44 into the pipe 2 to make up any deficiency in the drying gases. As an alternative, hot gases may also be supplied from a furnace 50. Only a small fraction of the hot gases which leave the separator 6 is passed to the washing tower 16, so that a correspondingly small fraction of the dried peat is lost in this tower. It is found that with this system temperature approaching 100° C. may be maintained in the circulating gases.

182,166. Artificial Silk and the Like, Manufacture of from Cellulose Derivatives. H. Dreyfus, 8, Waterloo Place, London, S.W.1. Application date, March 21, 1921.

The process is applicable to the manufacture of artificial silk or filaments by the dry spinning method from solutions of cellulose acetate, cellulose nitrate, or other cellulose esters, ethers, or other derivatives. To facilitate the drawing out of the filaments or threads from the spinning bath, the cellulose acetate or other derivative is mixed with one or more low boiling solvents or liquids and one or more higher boiling liquids, other than tetrachlorethane. The volatile solvent used may be acetone, methyl acetate or the like, and the high boiling solvent may have a boiling point of 100°–170° C. Suitable high boiling solvents are acetyl carbinol (boiling point 147° C.), acetyl acetone (boiling point 137° C.), cyclo pentanone (boiling point 130° C.), diacetone alcohol (boiling point 163°–165° C.), or cyclo butanone (boiling point 99° C.). The high boiling solvents should not be used in greater amount than 50–100 per cent. of the weight of the cellulose derivative, and preferably only from 25 to 50 per cent.

182,247. Petroleum Oils, Still for Fractionally Distilling. B. C. R. Marks, London. (From the Shell Co., 343, Sansome Street, San Francisco, Cal., U.S.A.) Application date, April 20, 1921.

The apparatus is more particularly for fractionally distilling the condensate obtained by the topping of crude petroleum, and the object is to separate this condensate into



182,247

various commercial products having a very narrow boiling range. The crude oil is delivered by a pump 54 to a series of pipe coils 61 in a still 51, and the hot oil and vapour are passed to the top of a separator 52. The oil is diverted outwards by a series of cones 62, and the vapour passes inwards into a central perforated pipe 64 and thence by a pipe 65 to a water cooled condenser 53, from which the uncondensed vapour is drawn off through a pipe 67. The condensate passes through a pipe 68 to the fractional still 55, which contains in its lower part a series of horizontal heating pipes 20 supported by heaters 14. The heating medium

consists of the hot oil residue which is received from the separator 52 through a pipe 69. The upper portion of the still is divided by transverse partitions into compartments, each having its separate vapour outlet 71, 72, 73. Steam is supplied to the liquid in each compartment by means of separate perforated pipes 23. The lower edges of the transverse partitions are always immersed in the liquid, so that the vapour spaces are isolated.

182,289. TANNING AGENT FOR THE CHROME TANNAGE OF LEATHER, PREPARATION OF. A. Glover and G. Martin, of the Co-operative Wholesale Society, Ltd., 109, Corporation Street, Manchester. Application date, May 26, 1921.

The process is for preparing the necessary basic chromium salt for the chrome tannage of leather by the one bath process. The salt is obtained by the reduction of bichromates of potassium or sodium in sulphuric or hydrochloric acid, yielding $Cr(OH)SO_4$ or $Cr(OH)Cl_2$, and the invention consists in effecting the reduction by means of whey powder obtained from the waste whey produced in cheese manufacture. The bichromate is placed in a lead-lined vat, and sulphuric acid is added, which raises the temperature nearly to boiling point and causes the bichromate to dissolve. The dried whey powder is then added gradually, and slowly dissolves, the liquor changing to a bluish-green colour.

182,302. REMOVING A LIQUID FROM THE SURFACE OF MOLTEN METAL, METHOD OF. Thermal Industrial and Chemical (T.I.C.) Research Co., Ltd., and J. S. Morgan, 52, Grosvenor Gardens, London, S.W.1. Application date, June 7, 1921.

The process is for removing the residual liquid from the surface of molten metal after a distillation treatment, or the drying of fusible solids by means of a bath of molten metal. The liquid is picked up from the surface of the molten metal, such as lead, by means of a revolving drum, disc or the like, preferably having a silica surface. The drum or disc may be partly immersed in the molten metal, or may be immersed only in the liquid which is to be removed. It is found that the molten metal does not adhere to the drum or disc. The liquid is removed from the drum by means of a scraper arranged near the highest point of the drum.

182,331. UREA, MANUFACTURE AND PRODUCTION OF. J. Y. Johnson, London. (From Badische Anilin & Soda Fabrik, Ludwigshafen on Rhine, Germany). Application date, July 11, 1921.

The process is for producing urea by heating ammonia and carbon dioxide under pressure, without the use of any compression apparatus. A highly concentrated solution of ammonium carbonate or carbamate is heated externally in a column by means of steam at about 12 atmospheres pressure. Ammonia, carbon dioxide, and water vapour are evolved under pressure due to the temperature, and the gases are passed through a cooler in which ammonium carbonate condenses to a liquid which is not allowed to solidify. The temperature of the cooler is 110°–150° C., according to the proportion of water vapour. The molten salt is run into an autoclave heated to about 130°–150° C. and urea is produced. The liquid leaving the column may be saturated with fresh ammonia and carbon dioxide obtained from the autoclave after the reaction is completed. The ammonia and carbon dioxide may be obtained from separate sources, and may be brought together in the cooler or in the autoclave. The ammonia may be distilled from aqueous ammonia, and the carbon dioxide from sodium or ammonium bicarbonate.

182,411. SODIUM CARBONATE, SEPARATING FROM LIQUORS OR SOLUTIONS CONTAINING CAUSTIC SODA. Courtaulds, Ltd., 19, Aldermanbury, London, and R. Owen, 21, Hoveden Road, Cricklewood, London. Application date, June 11, 1921.

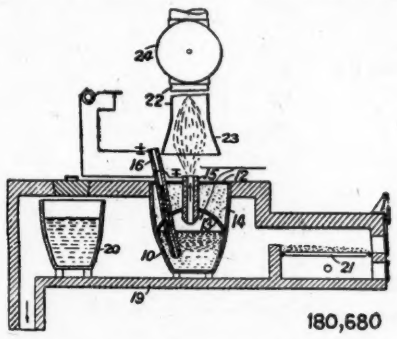
The object is to remove sodium carbonate from a solution containing caustic soda, such as that obtained by treating sodium carbonate with lime. The solution is treated with an excess of calcium carbonate to obtain a double carbonate of calcium and sodium, which is insoluble and is precipitated. This double carbonate may be filtered off and decomposed by means of water, to obtain a solution of sodium carbonate. Any sodium carbonate remaining in the caustic soda solution may be removed by evaporating it to 30–33 per cent. strength, and then cooling it to 10°–20° C. Practically the whole of the sodium carbonate is precipitated in fine crystals. Alternatively, strontium or barium oxide or hydroxide may be added in theoretical amount to the liquor, and the resulting carbonate of strontium or barium may be removed, washed and roasted to reconvert it into the oxide for use again. In an example, a solution of 66 parts of sodium carbonate in 200 parts of water is heated to 90° C. and 30 parts of quicklime are added gradually, the temperature being maintained by the heat of the reaction. The mixture is boiled for one hour, water being added to maintain a constant volume, and the mixture is cooled to 20°–30° C. It is found that the formation of the double carbonate of sodium and calcium is expedited by the presence of a small amount of the double carbonate, which may be added. The precipitated double carbonate is filtered out, and the solution contains 15·0–15·5 per cent. of caustic soda and 2·0–2·5 per cent. of sodium carbonate. The small remaining amount of sodium carbonate may be removed by concentrating the solution, or by adding the equivalent amount of strontium or barium oxide. The purified caustic soda contains less than 1 per cent. of sodium carbonate.

NOTE.—Abstracts of the following specifications, which are now accepted, appeared in THE CHEMICAL AGE when they became open to inspection under The International Convention :—155,834 (H. O. Traun's Forschungslaboratorium Ges.) relating to filter presses, see Vol. IV., p. 313; 163,975 (Aluminium Co. of America) relating to aluminium chloride, see Vol. V., p. 138.

International Specifications not yet Accepted

180,680. ZINC OXIDE. New Jersey Zinc Co., 160, Front Street, Manhattan, New York. (Assignees of F. G. Breyer, E. C. Gaskill, and J. A. Singmaster, Palmerton, Pa., U.S.A.) International Convention date, May 27, 1921.

A crucible 10 is provided with a double top 12, 13, enclosing insulating material 14, and two hollow graphite electrodes 15, 16 project into the crucible. Molten zinc from a melting pot 20 is fed through one electrode 16 which is immersed in the molten metal, and the vapour generated passes out at



180,680

about 2,000° C. through the other electrode 15 which terminates short of the molten metal. The zinc vapour burns at the outlet and the fume is drawn by a fan 24 into a conduit 23 leading to a condensing chamber. Air is also drawn in, and the fume is cooled rapidly. The zinc oxide thus obtained is very finely divided, the particles being only 0.25 microns or less, and when incorporated in rubber mixtures renders them about 20 per cent. more resistant to abrasion.

180,978. VULCANISING INDIARUBBER. Naugatuck Chemical Co., Elm Street, Naugatuck, Conn., U.S.A. (Assignees of S. M. Cadwell, 200, Ames Avenue, Leonia, N.J., U.S.A.). International Convention date, May 28, 1921.

An accelerator for use in vulcanising indiarubber consists of a substance obtained by the reaction of an aldehyde comprising an open chain having 2—7 carbon atoms, and a primary or secondary amine having an electrolytic dissociation constant greater than 1×10^{-12}. As an example, equal mole-

cular weights of heptaldehyde and aniline, and 5 per cent. of sulphur are heated to 140° C. until the water is evaporated, yielding the accelerator. An example of a rubber mixture comprises rubber 100 parts, zinc oxide 10 parts, sulphur 3 parts and 0·2—0·5 parts of the accelerator. The mixture is vulcanised under a steam pressure of 40 lb. per sq. in. for 60 minutes. The ingredients of the accelerator may be mixed separately with different portions of the rubber mixture, which are then mixed together and vulcanised. This accelerator prevents over and pre-vulcanisation, and yields a vulcanised rubber of high tensile strength.

180,988. ALCOHOL AND ETHER. A. A. L. J. Damiens, 167, Route d'Orleans, Arcueil-Cachan, Seine, France, M. C. J. E. de Loisy, 64, Rue la Boëtie, Paris, and O. J. G. Piette, 101, Avenue de la Toison d'Or, Brussels. International Convention date, June 2, 1921.

The process is for removing ethylene from industrial gases, such as natural gas, coke oven gas, illuminating gas, cracked oil gases, schist gases, and synthetic ethylenes. The gases are first treated to remove benzol, ammonia, water, sulphur compounds, hydrocarbons, and ethylene homologues. Ethylene is then absorbed by passing the gases through warm concentrated sulphuric acid containing a lower oxide or salt of a metal possessing more than one valency, such as iron, cobalt, nickel, cerium, manganese, titamum or tin. Examples of such oxides or salts are ferrous sulphate, cuprous chloride, copper sub-oxide, and cuprous sulphate. If higher oxides or salts be employed, a reducing agent must be added. The catalysts are insoluble in the sulphuric acid and may be recovered. The resulting ethyl hydrogen sulphate is hydrolysed to produce alcohol or ether. In treating illuminating gas for the recovery of ethylene, the purified gas is passed through a column of pumice wetted with sulphuric acid of 66° Bé., containing 4 per cent. of copper sub-oxide, and heated to 35°—40° C.

LATEST NOTIFICATIONS.

183,412. Process of treatment of marine algæ and means for carrying out said process. Soc. Maritime de Produits Chimiques. July 18, 1921.
183,419. Production of vat dyes. National Aniline and Chemical Co., Inc. July 20, 1921.
183,428. Manufacture of sulphonic acids of the 2: 3-oxynaphthoic acid arylides. Farbwerke vorm. Meister, Lucius und Brüning. July 19, 1921.
183,443. Process of purifying sulphate of baryta or other mineral substances. Teillard, A.L.A. July 18, 1921.
183,454. Preparation of anthranilic acid derivatives. Boehringer und Soehne Ges. July 20, 1921.
183,463. Method of dressing or concentrating carbonaceous slimes. Coppée, E. July 19, 1921.

Specifications Accepted, with Date of Application

156,725. Colloidally soluble substances. Process for the manufacture of—and of suspensions or emulsions. L. Lilienfeld. August 1, 1919.
157,281. Sulphuric acid, Method and apparatus for the manufacture of. A. Helbronner and P. Pipereaut. April 29, 1918.
157,318. Low temperature carbonisation of materials, Process of and apparatus for. G. Polysius. (Firm of). February 1, 1918.
157,412. Rubber, Process of vulcanising. F. T. Roberts. March 12, 1917.
157,978. Rubber containing latex, Process for treating. E. Hopkinson. January 16, 1920.
158,512. Sulphonated condensation products, Production of. Elektrochemische Werke Ges., H. Bosshard and D. Strauss. August 9, 1918.
159,886. Gas, Process for making. J. U. McDonald. March 10, 1920.
161,165. Magnesium chloride, Manufacture of. V. M. Goldschmidt. March 29, 1920.
161,976. Phenol contaminated liquors, Purification of. Koppers Co. April 30, 1920.
167,469. Electrolysis of solutions and apparatus therefor. Hooker Electro-chemical Co. August 5, 1920.
171,956. Napthalene and glycollic acid, Production of a condensation product from. Electrochemische Werke Ges., H. Bosshard and D. Strauss. July 4, 1919.
182,827-8. Crude oil and other liquids, Distillation of. P. Mather. January 11, 1921.
182,830. Cellulose acetate or products made therewith, Treatment of. R. Clavel. January 12, 1921.
182,832. Distilling alcoholic and other liquids, Process of. H. Wade. (*J. Schneible*). January 13, 1921.
182,843. Hydrocarbons, Oxidation of. F. W. Atack. February 9, 1921.
182,852. Hydrocarbons, Process and apparatus for manufacture of—from carbonaceous substances, such as coal, or from distillation products thereof. H. Plauson and J. A. Vielle. March 5, 1921.
182,859. Caliche, Treatment of. W. Broadbridge, E. Edser, and W. G. Sellers. March 9, 1921.
182,868. Tar or oils, Process and apparatus for the distillation of. E. Blumner. March 29, 1921.
182,869. Vapours and gases formed by heating fatty oils, gums, resins, and other organic materials, Processes and apparatus for treating. P. W. Webster. March 30, 1921.
182,886. Phenol and formaldehyde, Process for the manufacture of insoluble condensation products of. F. B. Dehn. (*S. Satow*). April 6, 1921.
182,927. Calcium hypochlorite, Process for the production of stable compounds of. Chemische Fabrik Griesheim-Electron. H. S. Schultze, G. Pistor, and H. Reitz. April 13, 1921.
183,044. Phthalimide, Process for the manufacture of. British Dyestuffs Corporation, Ltd., A. G. Green and S. J. Green. July 29, 1921.

Applications for Patents

Anderson, E.B., Baddiley, J., British Dyestuffs Corporation, Ltd., and Hill, J. Process for obtaining new shades on acetyl silk and new dyestuffs for use therein. 20829. July 29.
Boehringer Sohn, C. H. Method of preparing acetylene for anæsthetising. 20241. July 24.
British Dyestuffs Corporation, Ltd., and Hodgson, H. Manufacture of new intermediate compounds for production of colouring matters. 20830. July 29.
British Dyestuffs Corporation, Ltd., and Hodgson, H. Process for manufacture of dichlor fluorane. 20831. July 29.
Clavel, R. Treatment of cellulose derivatives. 20713. July 28.
Cocksedge, H. E. Process for manufacture of a sodium compound, etc. 20492. July 27.
Dreyfus, H. Manufacture of cellulose derivatives. 20557. July 27.
Field, S., and Petersson, F. Treatment of sulphide ores and minerals. 20623. July 27.
Guggenheim, Bros. Manufacture of sodium nitrate. 20192. July 24. (United States, January 19.)
Humphries, H. B. P. Ammonia distillation. 20684. July 28.
Maxted, E. B. Distillation of fatty acids, etc. 20386. July 26.
Scott, G. Manufacture of hydrogen and oxygen. 20353. July 25.
Shawinigan Laboratories, Ltd. Phenolic condensation products, and manufacture thereof. 20265. July 25. (United States, July 25, 1921.)
Soc. of Chemical Industry in Basle. Method of preventing bleeding in degumming raw silk in presence of silk dyed with vat dyestuffs. 20229. July 24. (Germany, August 13, 1921.)
Surpass Chemical Co., Inc., and White, A. E. Process of bleaching and dyeing fibre. 20468. July 26.
United Alkali Co., Ltd. Manufacture of cleansing compositions. 20730. July 28.
Verein für Chemische und Metallurgische Produktion. Continuously working apparatus for distillation of tar, etc. 20364. July 25. (Czecho-Slovakia, August 5, 1921.)
Zipser, S. Extraction of fatty, etc., matters by volatile solvents 20622. July 27. (Austria, September 10, 1921.)

Belgian Production of Ultramarine Blue

IN his recent Report on the Economic Situation in Belgium the Commercial Secretary to H.M. Embassy at Brussels states that the Belgian chemical industry is principally concerned with the production of industrial chemicals. It possesses an important market with the numerous manufacturers in the country needing supplies of chemicals, such as paper and textile mills, rubber works and the glass and ceramic industries, and also finds locally, to some extent, an easily accessible source of supply of raw material. Instability of agricultural prices has caused considerable nervousness among agriculturists, and sales of chemical manures have not get regained their pre-war proportions. Prior to the war the demand for superphosphate of lime was great, and there were 33 factories producing annually about 230,000 tons. Manufacturers of ultramarine blue have greatly extended their production, and now largely supply the home market, to the exclusion of British-made blue. The manufacture of coal-tar products is largely in the hands of one firm, which, owing to its joint Belgian and French interests, controls even where it does not manufacture the greater part of the production of coal-tar oils in Belgium.

Market Report and Current Prices

Our Market Report and Current Prices are exclusive to* THE CHEMICAL AGE, *and, being independently prepared with absolute impartiality by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., may be accepted as authoritative. The prices given apply to fair quantities delivered ex wharf or works, except where otherwise stated. The current prices are given mainly as a guide to works managers, chemists, and chemical engineers; those interested in close variations in prices should study the market report.

LONDON, AUGUST 3, 1922.

THE past week has seen a considerable amount of brisk trading. The consumptive demand is decidedly better and the outlook seems to be brighter than has been the case for some considerable time.

Export markets have shown greater activity and a fair volume of business has been transacted.

General Chemicals

ACETONE is again firmer and prices do not seem to have reached the top.

ACID ACETIC is an active market and prices are firmer.

ACID CITRIC is rather slow, but makers are upholding price.

ACID FORMIC is a quiet market. Price unchanged.

ACID LACTIC remains uninteresting.

ACID OXALIC.—There has been more inquiry, and a fair business is reported.

ACID TARTARIC is fractionally easier owing to second-hand offers. The undertone is firm.

BARIUM CHLORIDE is very scarce and phenomenal prices are paid for early delivery.

CREAM OF TARTAR.—A fair turnover is in evidence. Price unchanged.

IRON SULPHATE is without special feature.

LEAD ACETATE continues to advance in price with small but steady demand.

LEAD NITRATE is unchanged.

LITHOPONE is in fairly good request and the price is firmer.

POTASSIUM CARBONATE continues to favour buyers.

POTASSIUM CAUSTIC is stagnant.

POTASSIUM PRUSSIATE is very scarce for early delivery and holders of stocks are realising high prices.

SODA ACETATE is in good demand. Price firm.

SODA NITRITE.—Rather better business is reported. Price tends upward.

SODA PHOSPHATE remains unchanged.

SODA PRUSSIATE.—Makers are fully sold for this year, and high prices are realised for re-sale lots.

WHITE LEAD has advanced in price.

ZINC OXIDE is much firmer. Makers have advanced price.

Coal Tar Intermediates

Home trade during the past week has continued on moderately quiet lines, but the export market has been more interesting.

ALPHA NAPHTHOL is distinctly firmer in price with some fair export orders in the market.

ALPHANAPHTHYLAMINE has been enquired for on home account, but the actual business is not very large.

ANILINE OIL AND SALT are steady with export inquiries for the latter.

BENZALDEHYDE is in moderate demand for home consumption.

BENZIDINE BASE.—A small home business has been done.

BETA NAPHTHOL has home inquiries only, but the price is steady.

BETA NAPHTHYLAMINE.—There is some export inquiry about and a fair business has been concluded.

DIMETHYLANILINE is without special feature.

DIPHENYLAMINE is firm with small stocks available.

"H" ACID is in good demand for home consumption.

NITROBENZOL is quiet with price unchanged.

PARANITRANILINE is interesting both on home and export account.

PARAPHENYLENEDIAMINE is firm with a good steady business passing.

RESORCIN is steady and a small business in the market.

Coal Tar Products

The market maintains a fairly firm tone generally for most coal tar products.

90's BENZOL is quoted at 2s. per gallon on rails.

PURE BENZOL is inactive, and is worth about 2s. 4d. per gallon on rails.

CREOSOTE OIL is scarce for prompt delivery, and is firm in price, to-day's quotations being about 5½d. per gallon on rails in the North, and 6¼d. to 6½d. per gallon in the South.

CRESYLIC ACID is fairly steady, without showing any great activity, and the value is about 2s. 3d. to 2s. 4d. per gallon free on rails for the pale quality 97/99%, while the dark quality, 95/97%, is worth about 1s. 10d. to 2s.

SOLVENT NAPHTHA is rather better, and is quoted at 1s. 8d. to 1s. 9d. per gallon on rails.

HEAVY NAPHTHA is somewhat uninteresting, and is quoted at 1s. 9d. to 1s. 10d. per gallon.

NAPHTHALENE shows no change, and has little inquiry. It is worth about £4 10s. to £5 10s. for the crude qualities, while refined is worth from £16 to £20 per ton.

PITCH.—There is still a good demand and the market is firm.

Sulphate of Ammonia

There are no new features to report.

Current Prices

Chemicals

	Per	£	s.	d.		£	s.	d.
Acetic anhydride	lb.	0	1	8	to	0	1	10
Acetone oil	ton	77	10	0	to	80	0	0
Acetone, pure	ton	77	10	0	to	80	0	0
Acid, Acetic, glacial, 99–100%	ton	67	0	0	to	68	0	0
Acetic, 80% pure	ton	47	0	0	to	48	0	0
Arsenic, liquid, 2000 s.g.	ton	67	0	0	to	70	0	0
Boric, cryst.	ton	60	0	0	to	65	0	0
Carbolic, cryst. 39–40%	lb.	0	0	6	to	0	0	6½
Citric	lb.	0	2	3	to	0	2	4
Formic, 80%	ton	65	0	0	to	66	0	0
Gallic, pure	lb.	0	2	11	to	0	3	0
Hydrofluoric	lb.	0	0	7½	to	0	0	8½
Lactic, 50 vol.	ton	40	0	0	to	43	0	0
Lactic, 60 vol.	ton	43	0	0	to	45	0	0
Nitric, 80 Tw.	ton	30	0	0	to	31	0	0
Oxalic	lb.	0	0	8	to	0	0	8½
Phosphoric, 1.5	ton	38	0	0	to	40	0	0
Pyrogallic, cryst.	lb.	0	6	0	to	0	6	3
Salicylic, Technical	lb.	0	0	10½	to	0	1	0
Salicylic, B.P.	lb.	0	1	5	to	0	1	6
Sulphuric, 92–93%	ton	7	10	0	to	8	0	0
Tannic, commercial	lb.	0	2	3	to	0	2	9
Tartaric	lb.	0	1	5	to	0	1	5½
Alum, lump	ton	10	0	0	to	10	10	0
Alum, chrome	ton	28	0	0	to	29	0	0
Alumino ferric	ton	9	0	0	to	9	5	0
Aluminium, sulphate, 14–15%	ton	10	10	0	to	11	0	0
Aluminium, sulphate, 17–18%	ton	11	10	0	to	12	0	0
Ammonia, anhydrous	lb.	0	1	8	to	0	1	9
Ammonia, .880	ton	33	0	0	to	35	0	0
Ammonia, .920	ton	21	0	0	to	23	0	0
Ammonia, carbonate	lb.	0	0	4	to	0	0	4½
Ammonia, chloride	ton	60	0	0	to	65	0	0
Ammonia, muriate (galvanisers)	ton	35	0	0	to	37	10	0
Ammonia, nitrate (pure)	ton	35	0	0	to	40	0	0
Ammonia, phosphate	ton	74	0	0	to	75	0	0
Ammonia, sulphocyanide	lb.	0	1	10	to	0	2	0
Amyl acetate	ton	175	0	0	to	185	0	0
Arsenic, white, powdered	ton	42	0	0	to	44	0	0
Barium, carbonate, 92–94%	ton	12	10	0	to	13	0	0
Barium, Chlorate	ton	60	0	0	to	68	0	0
Barium Chloride	ton	23	0	0	to	23	0	0
Nitrate	ton	27	10	0	to	30	0	0
Sulphate, blanc fixe, dry	ton	20	10	0	to	21	0	0
Sulphate, blanc fixe, pulp	ton	10	5	0	to	10	10	0
Sulphocyanide, 95%	lb.	0	1	0	to	0	1	3
Bleaching powder, 35–37%	ton	12	0	0	to		—	
Borax crystals	ton	29	0	0	to	33	0	0
Caffein	lb.	0	13	0	to	0	14	0

	Per	£	s.	d.		£	s.	d.
Calcium acetate, Brown	ton	9	0	0	to	9	10	0
,, ,, Grey	ton	13	10	0	to	14	0	0
Calcium Carbide	ton	16	0	0	to	17	0	0
Chloride	ton	6	10	0	to	7	0	0
Carbon bisulphide	ton	50	0	0	to	52	0	0
Casein, technical	ton	47	0	0	to	55	0	0
Cerium oxalate	lb.	0	4	6	to	0	4	9
Chromium acetate	lb.	0	1	1	to	0	1	3
Cobalt acetate	lb.	0	6	0	to	0	6	6
Oxide, black	lb.	0	9	6	to	0	10	0
Copper chloride	lb.	0	1	2	to	0	1	3
Sulphate	ton	28	10	0	to	29	0	0
Cream Tartar, 98–100% ..	ton	115	0	0	to	117	10	0
Epsom salts (*see* Magnesium sulphate)								
Formaldehyde, 40% vol. ..	ton	68	10	0	to	70	0	0
Formusol (Rongalite)	lb.	0	2	6	to	0	2	9
Glauber salts, commercial ..	ton	5	10	0	to	6	0	0
Glycerine, crude	ton	65	0	0	to	67	10	0
Hydrogen peroxide, 12 vols. ..	gal.	0	2	5	to	0	2	6
Iron perchloride	ton	30	0	0	to	32	0	0
Iron sulphate (Copperas) ..	ton	4	0	0	to	4	5	0
Lead acetate, white	ton	41	0	0	to	42	0	0
Carbonate (White Lead) ..	ton	43	0	0	to	47	0	0
Nitrate	ton	46	10	0	to	48	10	0
Litharge	ton	35	10	0	to	36	0	0
Lithopone, 30%	ton	23	10	0	to	24	0	0
Magnesium chloride	ton	10	0	0	to	10	10	0
Carbonate, light	cwt.	2	10	0	to	2	15	0
Sulphate (Epsom salts commercial)	ton	8	0	0	to	8	10	0
Sulphate (Druggists') ..	ton	13	10	0	to	14	10	0
Manganese, Borate, commercial	ton	65	0	0	to	75	0	0
Sulphate	ton	60	0	0	to	62	0	0
Methyl acetone	ton	60	0	0	to	65	0	0
Alcohol, 1% acetone ..	ton	65	10	0	to	66	0	0
Nickel sulphate, single salt ..	ton	49	0	0	to	51	0	0
Ammonium sulphate, double salt	ton	51	0	0	to	52	0	0
Potash, Caustic	ton	33	0	0	to	34	0	0
Potassium bichromate	lb.	0	0	6½	to		—	
Carbonate, 90%	ton	31	0	0	to	33	0	0
Chloride, 80%	ton	12	0	0	to	12	10	0
Chlorate	lb.	0	0	4½	to	0	0	5
Metabisulphite, 50–52% ..	ton	84	0	0	to	90	0	0
Nitrate, refined	ton	45	0	0	to	47	0	0
Permanganate	lb.	0	0	9	to	0	0	10
Prussiate, red	lb.	0	4	6	to	0	4	9
Prussiate, yellow	lb.	0	1	7½	to	0	1	8½
Sulphate, 90%	ton	13	0	0	to	13	10	0
Salammoniac, firsts	cwt.	3	3	0	to		—	
Seconds	cwt.	3	0	0	to		—	
Sodium acetate	ton	24	10	0	to	24	15	0
Arseniate, 45%	ton	45	0	0	to	48	0	0
Bicarbonate	ton	10	10	0	to	11	0	0
Bichromate	lb.	0	0	5½	to		—	
Bisulphite, 60–62% ..	ton	23	0	0	to	24	0	0
Chlorate	lb.	0	0	3½	to	0	0	4
Caustic, 70%	ton	20	10	0	to	21	0	0
Caustic, 76%	ton	21	10	0	to	22	10	0
Hydrosulphite, powder, 85%	lb.	0	1	9	to	0	2	0
Hyposulphite, commercial	ton	13	10	0	to	14	0	0
Nitrite, 96–98%	ton	31	0	0	to	32	0	0
Phosphate, crystal	ton	18	10	0	to	19	0	0
Perborate	lb.	0	0	11	to	0	1	0
Prussiate	lb.	0	0	11½	to	0	1	0
Sulphide, crystals	ton	13	0	0	to	14	0	0
Sulphide, solid, 60–62% ..	ton	21	10	0	to	23	10	0
Sulphite, cryst.	ton	12	10	0	to	13	0	0
Strontium carbonate ..	ton	55	0	0	to	60	0	0
Strontium Nitrate	ton	50	0	0	to	55	0	0
Strontium Sulphate, white ..	ton	6	10	0	to	7	10	0
Sulphur chloride	ton	25	0	0	to	27	10	0
Sulphur, Flowers	ton	13	0	0	to	14	0	0
Roll	ton	13	0	0	to	14	0	0
Tartar emetic	lb.	0	1	6	to	0	1	7
Theobromine	lb.	0	14	0	to	0	14	6
Tin perchloride, 33%	lb.	0	1	2	to	0	1	4
Perchloride, solid	lb.	0	1	5	to	0	1	7
Protochloride (tin crystals)	lb.	0	1	5	to	0	1	6
Zinc chloride 102° Tw.	ton	21	0	0	to	22	10	0
Chloride, solid, 96–98% ..	ton	25	0	0	to	30	0	0
Oxide, 99%	ton	36	0	0	to	38	0	0
Dust, 90%	ton	45	0	0	to	47	10	0
Sulphate	ton	18	10	0	to	19	10	0

Coal Tar Intermediates, &c.

	Per	£	s.	d.		£	s.	d.
Alphanaphthol, crude	lb.	0	2	3	to	0	2	6
Alphanaphthol, refined	lb.	0	3	0	to	0	3	3
Alphanaphthylamine	lb.	0	2	0	to	0	2	1
Aniline oil, drums extra	lb.	0	1	0	to	0	1	1
Aniline salts	lb.	0	1	1	to	0	1	2
Anthracene, 40–50%	unit	0	0	8½	to	0	0	9
Benzaldehyde (free of chlorine) ..	lb.	0	3	9	to	0	4	3
Benzidine, base	lb.	0	5	9	to	0	6	0
Benzidine, sulphate	lb.	0	5	9	to	0	6	0
Benzoic acid	lb.	0	1	9	to	0	2	0
Benzoate of soda	lb.	0	1	7½	to	0	1	9
Benzyl chloride, technical ..	lb.	0	2	0	to	0	2	3
Betanaphthol benzoate	lb.	0	4	9	to	0	5	0
Betanaphthol	lb.	0	1	4	to	0	1	4½
Betanaphthylamine, technical ..	lb.	0	6	0	to	0	7	0
Croceine Acid, 100% basis ..	lb.	0	3	6	to	0	3	9
Dichlorbenzol	lb.	0	0	9	to	0	0	10
Diethylaniline	lb.	0	2	9	to	0	3	0
Dinitrobenzol	lb.	0	1	3	to	0	1	4
Dinitrochlorbenzol	lb.	0	0	11	to	0	1	0
Dinitronaphthalene	lb.	0	1	4	to	0	1	5
Dinitrotoluol	lb.	0	1	5	to	0	1	6
Dinitrophenol	lb.	0	2	9	to	0	3	0
Dimethylaniline	lb.	0	2	3	to	0	2	6
Diphenylamine	lb.	0	4	3	to	0	4	6
H-Acid	lb.	0	6	6	to	0	7	0
Metaphenylenediamine	lb.	0	5	6	to	0	5	9
Monochlorbenzol	lb.	0	0	10	to	0	1	0
Metanilic Acid	lb.	0	6	0	to	0	6	6½
Monosulphonic Acid (2.7) ..	lb.	0	5	6	to	0	6	0
Naphthionic acid, crude ..	lb.	0	3	0	to	0	3	3
Naphthionate of Soda	lb.	0	3	0	to	0	3	3
Naphthylamin-di-sulphonic-acid	lb.	0	4	0	to	0	4	3
Neville Winther Acid	lb.	0	7	9	to	0	8	0
Nitrobenzol	lb.	0	0	9	to	0	0	9½
Nitronaphthalene	lb.	0	1	4	to	0	1	5
Nitrotoluol	lb.	0	1	0	to	0	1	2
Orthoamidophenol, base	lb.	0	10	0	to	0	10	5
Orthodichlorbenzol	lb.	0	1	0	to	0	1	1
Orthotoluidine	lb.	0	1	6	to	0	1	9
Orthonitrotoluol	lb.	0	0	10	to	0	1	0
Para-amidophenol, base	lb.	0	10	0	to	0	10	6
Para-amidophenol, hydrochlor ..	lb.	0	10	6	to	0	11	0
Paradichlorbenzol	lb.	0	0	6	to	0	0	7
Paranitraniline	lb.	0	3	6	to	0	3	9
Paranitrophenol	lb.	0	2	3	to	0	2	6
Paranitrotoluol	lb.	0	5	0	to	0	5	3
Paraphenylenediamine, distilled	lb.	0	10	6	to	0	10	9
Paratoluidine	lb.	0	7	0	to	0	7	6
Phthalic anhydride	lb.	0	2	9	to	0	3	0
Resorcin, technical	lb.	0	5	6	to	0	6	0
Resorcin, pure	lb.	0	7	0	to	0	7	3
Salol	lb.	0	2	0	to	0	2	3
Sulphanilic acid, crude	lb.	0	1	0	to	0	1	1
Tolidine, base	lb.	0	6	6	to	0	7	0
Tolidine, mixture	lb.	0	2	6	to	0	2	9

The Extraction of Lactose

At a meeting of the council of the Royal Agricultural Society on Wednesday, Mr. Dampier Whetham gave an account of experiments in the utilisation of whey which are being carried out under the auspices of the Research Committee of the society. Forty million gallons of whey, he said, were wasted annually in this country, a volume which contained £1,000,000 worth of lact-albumen and lactose. The published accounts of foreign methods of the manufacture of lactose seemed incomplete, and the factories were not shown to strangers. To start the industry in England, therefore, experiments were necessary, and when the Research Committee was formed last March it decided to undertake them in conjunction with Mr. Whetham and the Ministry of Agriculture, who were already experimenting on the subject. As a result the Research Committee engaged a chemist, Mr. Leonard Harding, who first carried out a series of laboratory experiments at Cambridge, and is now working at Hilfield, Dorset, where Mr. Whetham equipped last year a small experimental lactose factory. Mr. Harding worked out in the laboratory a satisfactory method of extracting lactose, which follows the general lines of what seem to be the foreign methods, and is now testing it with success on a large scale. Experiments are also being made to decide the best method of separating the albumen and in the production of a soluble form of dried whey, which might be made in cheese factories and used as a raw material in the manufacture of milk sugar.

Scottish Chemical Market

The following notes on the Scottish Chemical Market are specially supplied to THE CHEMICAL AGE by Messrs. Charles Tennant and Co., Ltd., Glasgow, and may be accepted as representing the firm's independent and impartial opinions.

GLASGOW, AUGUST 2, 1922.

THE past week has shown little change in the amount of business put through, although inquiries were more numerous.

Owing to lower railway rates now in force, makers are enabled slightly to reduce delivered prices.

Industrial Chemicals

ACETONE.—Supplies somewhat scarce and higher prices are looked for.

ACID ACETIC.—A fair inquiry both home and export. Glacial 98/100 per cent., £56 to £58 per ton; 80 per cent. technical, £38 to £39 per ton; 80 per cent. B.P., £44 to £45 per ton.

ACID BORACIC.—No change in price. Crystal or granulated £60 per ton; powdered, £62 per ton.

ACID CARBOLIC CRYSTALS.—Moderate inquiry. Quoted 6d. to 6½d. per lb.

ACID HYDROCHLORIC.—Still in little request. 6s. 6d. per carboy ex works.

ACID NITRIC, 80 °.—Quoted £25 to £26 per ton ex works.

ACID OXALIC.—Price 7¾d. to 8d. per lb.

ACID SULPHURIC.—Makers' prices unchanged. 144°, £4 per ton; 168°, £7 5s. per ton; de-arsenicated quality £1 extra.

ALUM, LUMP POTASH.—Cheap Continental offers of £11 per ton. c.i.f. U.K.

ALUMINA SULPHATE.—In little demand. 14/15 per cent., about £9 per ton; 17/18 per cent., £11 per ton, c.i.f. U.K. prompt.

AMMONIA, ANHYDROUS.—On offer at 1s. 9d. per lb. ex works.

AMMONIA MURIATE.—Grey galvanisers quality, £34 to £35 per ton; fine white quality, £29 to £30 per ton.

AMMONIA SULPHATE.—25¼ per cent, £14 10s., per ton; 25¾ per cent. neutral, £15 13s. per ton ex works.

ARSENIC, WHITE POWDERED.—Moderate inquiry, £44 to £45 per ton, ex quay.

BARIUM CHLORIDE, 98/100 PER CENT.—English material £22 per ton. Continental quotations of £20 per ton c.i.f. U.K.

BARYTES.—Finest white English, £5 5s. per ton ex works. Continental offers of finest white at £4 15s. per ton. c.i.f.

BLEACHING POWDER.—Reduction of 5s. per ton. Now £12 15s. per ton ex station.

BORAX.—Price unchanged. Crystal or granulated £29 per ton, powdered £30 per ton.

CALCIUM CHLORIDE.—Pride reduced by 10s. per ton. Now £6 per ton, ex station.

COPPER SULPHATE.—Quoted £27 to £28 per ton, ex quay.

FORMALDEHYDE, 40 PER CENT.—Moderate export inquiry. £66 to £67 per ton, f.o.b. forward delivery. Spot lots £70 per ton.

GLAUBER SALTS.—In little demand. £4 to £5 per ton, according to quality.

LEAD ACETATE.—Continental make on offer at £35 per ton, for white crystals.

LEAD NITRATE, WHITE CRYSTALS, 99 PER CENT.—Offered at £42 per ton ex warehouse.

LEAD.—Red, advance in price of 30s. per ton. Now £39 delivered. White, 20s. per ton increase. Now £51 10s. per ton delivered.

MAGNESITE, GROUND CALCINED.—Moderate inquiry. £9 to £12 per ton, according to quality.

MAGNESIUM CHLORIDE.—Spot lots quoted £6 15s. per ton, ex store.

MAGNESIUM SULPHATE (EPSOM SALTS).—No change in price. Commercial £7 10s. per ton; B.P. quality £9 15s. per ton.

METHYLATED SPIRIT, INDUSTRIAL 64 PER CENT. O.P.—Price is reduced to 2s. 8d. per gallon delivered.

POTASSIUM BICHROMATE.—English make 6½d. per lb. delivered.

POTASSIUM CARBONATE, 90/92 PER CENT.—Spot lots on offer at £29 per ton ex store.

POTASSIUM CAUSTIC, 88/92 PER CENT.—Quoted £32 per ton. On offer at £30 per ton, forward delivery.

POTASSIUM CHLORATE.—English make 5d. per lb. Continental 4d. per lb. c.i.f.

POTASSIUM NITRATE (SALTPETRE).—Quoted £33 per ton, spot spot delivery. Offered for forward delivery at £27 per ton, c.i.f.

POTASSIUM PERMANGANATE.—Price about 9½d. to 10d. per lb. delivered.

PYRITES, NORWEGIAN NON-CUPREOUS FINES.—Offered at 8d. per unit of sulphur, c.i.f.

SODIUM BICARBONATE.—Reduction of 10s. per ton. Now £10 10s., per ton, ex quay or station.

SODIUM BICHROMATE.—English make 5d. per lb. delivered.

SODIUM CARBONATE (SODA CRYSTALS).—Now £5 15s. per ton, ex quay or station.

SODIUM CARBONATE (ALKALI).—No change in price. £9 2s. 6d. per ton ex quay or station.

SODIUM CAUSTIC.—Price reduced by 5s. per ton. 76/77 per cent., £23 5s.; 70/72 per cent., £21 5s.; 60 per cent., £24; 98/99 per cent., powdered, £26 15s. to £27 15s. per ton, ex station.

SODIUM HYPOSULPHITE.—Commercial £13 10s to £14 per ton.; pea cystals, £19 to £20 per ton.

SODIUM NITRATE.—Ordinary quality, £14 per ton; refined, £14 5s. per ton, f.o.r. or f.o.b.

SODIUM SULPHATE (SALTCAKE, 95 PER CENT.).—No change in price of £4 per ton, delivered. Quantities for export at same figure.

SODIUM SULPHIDE, 60/62 PER CENT.).—English make £21 per ton. Continental £16 per ton, c.i.f.

SULPHUR.—Government stock of Sicilian Thirds still on offer at £4 5s. to £4 15s. per ton; flowers, £14 per ton; roll, £13; rock, £12; ground, £12. Moderate inquiry for flowers.

TIN CRYSTALS.—Quoted 1s. 2d. to 1s. 4d. per lb.

ZINC, CHLORIDE, 102° TW.—Moderate inquiry. £20 to £21 per ton.

NOTE.—The above prices are for bulk business and are not to be taken as applicable to small parcels.

Coal Tar Intermediates and Wood Distillation Products

ALPHANAPHTHOL.—Home inquiry. Offered at 2s. 9d. per lb. delivered.

ALPHANAPHTHYLAMINE.—Inquiries for home trade. Price quoted, 2s. 1d. per lb. delivered.

AMIDO NAPHTHOL SULPHONIC ACID, 1.2.4.——Home inquiry. Price quoted, 4s. 7d. per lb. 100% basis.

BENZIDINE BASE.—Inquiry for the home trade. Price quoted, 2s. 6d. per lb. on 100% basis.

BETANAPHTHOL.—Prices remain firm, at 1s. 3d. to 1s. 4d. per lb.

BETANAPHTHYLAMINE.—Inquiry for the home trade. Price quoted, 5s. per lb. delivered.

CLEVES ACID.—Now quoted at 4s. 6d. per lb. 100% basis.

DIPHENYLAMINE.—Home inquiry. Price quoted, 4s. 3d. per lb. delivered.

FREUNDS ACID.—Offered at 6s. per lb on 100% basis.

METANILIC ACID.—Inquiry for the home trade. Price quoted 3s. 9d. per lb. 100% basis.

META-NITRANILINE.—Home inquiry. Price quoted, 5s. 6d. per lb. delivered.

METAPHENYLENEDIAMINE.—Remains firm, at 6s. per lb. delivered.

NAPHTHIONIC ACID.—Home inquiry. Price quoted, 3s. per lb. 100% basis.

NAPHTHOL R SALT.—Home inquiry. Price quoted 3s.4½d. per lb. on 100% basis.

NEVILLE WINTHER ACID (SODIUM SALT).—Offered at 8s per lb. 100% basis.

ORTHO TOLUIDINE.—Home inquiry. Offered at 1s. 6d. to 1s. 7d. per lb.

PARA AMIDO PHENOL BASE.—Home inquiry. Price quoted, 7s. 6d. per lb. 100% basis.

PARA AMIDO PHENOL HYDROCHLORIDE.—Price quoted, 8s. 8d. per lb. 100% basis.

PARACHLORANILINE.—Offered at 3s. per lb. ex works.
PARANITRANILINE.—Home inquiry. Price quoted, 3s. 3d. per lb. delivered.
TOLIDINE BASE.—Home inquiry. Price 7s. 9d. per lb. 100% basis.
TOLUOL.—Pure is offered at 2s. 7d. per gallon; 90s. 2s. 2d. per gallon ex works.

German Chemical Trade Notes

FROM OUR OWN CORRESPONDENT.

Berlin, July 31, 1922.

THE economic position in Germany is daily becoming worse (the exchange rates on Saturday last were: New York, 610 marks; London, 2,690–2,710 marks).

Prices are steadily advancing, and forward business is almost impossible. On the whole the market is very firm; stockholders as well as consumers are, of course, reluctant, and speculators are inclined to heavy buying with practically no offerings on the market.

The chemical factory of Messrs. Heinrich Kolurg at Leipzig has been gutted by fire, and large stocks of chemicals were destroyed.

The following quotations, which are given in marks per kilogram (d=domestic, e=export price), are only approximate.

ACIDS: Acetic, 80%, in good demand at 62 mk. d. Boric, held at 145/150 mk. d. Citric, loose, worth 480 mk. d.; 500 mk. e. Formic, 85%, bought at 38 mk. d. Oxalic, 98/100%, in brisk demand at 48 mk. d; 100/140 mk. e. Salicylic, orders from abroad at 300/350 mk.; 200 mk. d. Tartaric, 325 mk. d.; 360 mk. e.

INDUSTRIAL CHEMICALS: Alum, potash crystal powder is quoted 12/13 mk. d.; 16 mk. e; lumps, 16 mk. d; 22/23.50 mk. e. Alumina sulphate, 17/18%, sold at 16 mk. e. Ammonia carbonate, ground, 24 mk. d; 47 mk. e. Barium carbonate, moderate sales 22 mk. d. Barium chloride, 26 mk. d; 38 mk. e. Bleaching powder, 9.50 mk. d; 16.50 mk. e. Borax is quoted at 72/74 mk. d. Calcium chloride, 8 mk. d; 9.50 mk. e. Chrome alum, 15%, 43/50 mk. d; 58/64 mk. e. Copperas, in good demand at 7/7.50 mk. d; 9 mk. e. Copper sulphate, 98/100%; brisk business was done at 56/59 mk. d; 63 mk. e, or £26 10/- to £29 10/- per ton. Epsom salt, crystallised is obtainable at 4.75 mk. d; 6.75 mk. e. Formaldehyde, 40%; 115 mk. d; 125 mk. e. Glauber's salt, crystalised, 2.90/3 mk. d; 525 mk. e. Glycerine, double distilled, 28° Bé. is worth to-day 125 mk. d; 160 mk. e. Iron nitrate, 40° Bé., recently quoted at 6 mk. d; demand brisk and business fair. Litharge is fetching 66 mk. d; 80 mk. e. Lithopone, red seal, 28/30 mk. d. Magnesium chloride, fused, 3.75 mk. d.; 8.50 mk. e. Naphthalene is meeting with active interest at 25 mk. d.; 32 mk. e. (balls), and 24 mk. d.; 30 mk. e. (flakes). Potash bichromate, 83/85 mk. d.; 115 mk. e. Potash carbonate, 96/98%, 37.50 mk. d.; 61.50 mk. e.; considerable orders having been placed at these figures. Potash caustic is selling at 34/37 mk. d.; 61 mk. e.; Liquor, 16.15 mk. d. Potash chlorate is offered at 39/43 mk. d.; 51/52 mk. e. Potash metabisulphate, 65 mk. d. Potash permanganate is worth 110 mk. d.; 130 mk. e. Potash prussiate, yellow, 285/300 mk. d.; red, 700 mk. d. Potash saltpetre, 35 mk. d. Sal ammoniac, white crystallised, 38/44 mk. d.; 52/56 mk. e. Salt cake is bought at 7.50 mk. d.; 8 mk. e. Soda ash, 98/99%, meeting with considerable demand at 16.50/17 mk. d.; 16 mk. e. Soda bicarbonate, 12/15 mk. d.; 23 mk. e. Soda caustic, 125/128° can be had at 37/38 mk. d.; 39 mk. e; liquor, 13.50/14 mk. d. Soda crystals, 11 mk. d. Soda hyposulphite, pea form, 16/19.50 mk. d.; 21/23 mk. e.; crystallised, 13/17 mk. d.; 19 mk. e. Soda saltpetre, technical is sold at 22 mk. d. Soda silicate, 38/40° worth 4.75 mk. d; 7 mk. e. Soda sulphide, 30/32°, 12 mk. d.; 13 mk. e; 60/62%, 24/25 mk. d.; 30 mk. e. Sugar of lead, refined crystallised, 65/75 mk. d.; 81/85 mk. e. Zinc chloride stands at 27.50 mk. d; 35 mk. e. Zinc sulphate, 23 mk. e. Zinc white, red seal, 60/66 mk. d.; 72/75 mk. e; Green seal, 76 mk. e.

The Nitrate Market

Producers' Sales in July: Improving Demand

IN their monthly report on nitrate of soda, dated July 31, Henry Bath and Son, Ltd., state that spot demand in Europe during the past out-of-season month has naturally been on a smaller scale, though nevertheless the deliveries from ports of 26,000 tons exceed those of July last year by 6,000 tons. Nitrate for spot delivery in continental markets realised £12 to £12 10s. according to fluctuations in exchange, and August delivery has been sold from £11 5s. to £12. Autumn delivery is quoted about £11 15s., and Spring, 1923, at £12 5s. to £12 10s. per ton.

Sales by the Pool during July reached about 80,000 tons, and the growing attenuation of unsold Pool stocks is contributing to the gradual re-establishment of a market for cargoes, in which 11s. 1½d. to 11s. 4½d. per cwt. c.i.f. Havre-Hamburg has been paid for July-August liner parcels. The present quotation is about 11s. 6d. to 11s. 7½d. for August-September shipment.

A large business has been transacted by the Nitrate Producers' Association, the month's sales amounting to about 190,000 tons, and bringing total sales to date to about 450,000 tons for shipment from July onwards. It is unlikely that the Association will sell further for earlier than September delivery, for which the price is 19s. 6d. per metric quintal first half and 19s. 9d. second half of the month. The bulk of the nitrate sold has been for July and August delivery, but latterly the demand has shown some expansion and round quantities have been disposed of for monthly delivery up to March next. The results so far obtained by the Association's policy of selling must be regarded as very satisfactory, and the improvement in Chilean exchange reflects the more hopeful feeling which is prevalent in that country.

End of the "Pool"

The Nitrate Pool, formed in February, 1921, virtually disappears at the end of this month, when the major portion of unsold stocks will be redistributed among members. The quantity of nitrate so distributed is less than 80,000 tons, an amount so moderate that its decontrol can do no harm and ought indeed to impart more elasticity to the market.

Early in July nitrogen prices in Germany were increased to 72.20 m. per unit of 100 kilos for sulphate of ammonia and to 86.90 m. for nitrate of soda. Another material increase must be looked for to compensate for the further slump in the value of the mark. Freights are firmer with liner space fixed at 27s. 6d. for September and 30s. for December-January for the usual range, while 28s. 9d. was paid for October-November loading by sail.

Minerals Separation

Expert's Opinion on New System of Briquetting

PRESIDING on January 28 at the annual meeting of Minerals Separation, Ltd., Mr. F. L. Gibbs said that a leading French expert in briquette manufacture had declared that the company's new system of briquetting was not merely an improvement on the present system, it marked a revolution in the briquetting industry. All who had seen it admitted that it could not fail to be cheaper in capital and working cost, and productive of a cleaner fuel than any other system known. Their long-term agreement with the Powell-Duffryn Company had been finally ratified, and he was confident would result in excellent business for both companies.

The combination of interests of these two companies was a factor of the highest importance in the coal industry, and the manufacture of patent fuel would experience a revolution from the discoveries made. It had been decided to erect a small briquetting plant at Ashington, to run in conjunction with the flotation installation in daily operation there, where large scale tests were carried out on coals from collieries in the north.

The erection of a plant treating 600 tons per day at the Skinningrove Iron Company's works had made considerable progress, and they were gratified by the success so far obtained in the problem of getting rid of the moisture content in the coal after passing through the flotation system. At the Oughterside colleries in Cumberland they had erected a plant which had commenced operations, and enabled the owners to produce from their coals an excellent metallurgical coke far superior to that previously produced. At the Low Laithas colliery in Yorkshire a 250-ton plant was being erected, and one of similar capacity was under construction for the Team By-Products Coke Company. The Powell-Duffryn Company, after innumerable tests, had decided to instal two large plants for the treatment of coking coals for the production of metallurgical coke.

Company News

ANTOFAGASTA NITRATE CO.—Letters of renunciation in respect of the company's 6½ per cent. first mortgage debentures must be left with the Law Debenture Corporation not later than August 9, after which date no effect can be given to any renunciations.

CORNISH KAOLIN, LTD.—The accounts for the year ended March 31 show a loss of £3,542, which brings the total debit balance up to £6,868. The report states that attention was almost entirely directed to the development and equipment of the property.

CONSETT SPANISH ORE.—The net revenue for the year ended June 30 last was £5,047, which with £473 from the undivided profits account makes a total of £5,520. The interim dividend paid on February 15 last absorbed £2,760, leaving £2,760 for a final dividend of 1s. per share. The annual meeting will be held to-day (Saturday) at the Central Station Hotel, Newcastle-on-Tyne.

VICKERS, LTD.—The directors announce interim dividends for the half-year ended June 30 last of 2½ per cent. on the preferred 5 per cent. stock (less tax), 2½ per cent. on the 5 per cent. preference shares (less tax), and 2½ per cent. on the cumulative preference shares (free of tax up to 6s. in the £), payable on August 17 to holders registered on August 5. The transfer books of these issues will be closed from August 7 to 12 inclusive.

WELSBACH LIGHT CO.—The report for the year ended March 31 states that £10,124 from general reserve has been applied in writing down investments in associated companies, leaving general reserve at £50,000. The net profit (including investment interest, profit on investment realisations, and on debenture redemption, together £12,906), without taking credit for any E.P.D. recovery, but subject to taxes, is £9,726 (against £13,135). The amount brought forward, £21,583, brings the total up to £31,309, out of which a dividend of 5 per cent., less tax (the same), has been declared, £18,412 being carried forward.

BROKEN HILL PROPRIETARY BLOCK 10.—The report for the half-year to March 31 last, submitted at the meeting held in Melbourne on May 22, states that the directors regret that during the half-year there has been no alteration in the industrial position at Broken Hill to warrant consideration of resumption of operations. The total loss for the half-year is £5,350, as follows: Working loss, £4,134; depreciation written off, £1,216—£5,350, from which is deducted interest and sundry receipts £723, leaving £4,627 carried to debit of profit and loss account. The balance at credit of profit and loss account, after deducting the net loss of £4,627 shown above, is £36,529. The mine and plant are being maintained in good order.

JOHN BELL AND CROYDEN, LTD.—The Constructive Finance Co., Ltd., who have purchased £125,000 John Bell and Croyden, Ltd., 7 per cent. first mortgage debenture stock from the company, have been offering the same for sale at 97 per cent. The first payment of interest, calculated from the date of acceptance, will be made on November 30 next. The company which has an authorised capital of £175,000 in 169,000 10 per cent. cumulative participating preference shares of £1, and 120,000 ordinary shares of 1s. each, was incorporated in May, 1921, to acquire John Bell and Croyden, Ltd., general chemists and druggists, of Wigmore Street, London, and Langham Brothers, Ltd., chemical manufacturers, of Perivale Works, London. The subscription list was closed on Tuesday.

HAMPDEN CLONCURRY COPPER MINES.—According to cable information, the accounts of the Hampden Cloncurry Copper Mines for the half-year ended February 28 show that the loss transferred to appropriation account was £4,512. This, added to £8,798 transferred to depreciation reserve, made a total debit to appropriation account of £13,310. This is absorbed by a similar amount transferred from equalisation reserve. No smelting took place due to continued high costs. Unless substantial reductions are made resumption is economically impossible. The ore reserves raised and on the surface were 135,000 tons, estimated to contain 7,110 tons copper, inclusive of 73,000 tons concentrating ore, estimated to contain 2,190 tons copper but exclusive of several thousand tons in smaller mines, estimated to contain 500 to 600 tons copper and 60,000 to 70,000 tons low grade fluxing ore, estimated to contain 500 to 600 tons copper. The loss transferred to appropriation for the corresponding half-year amounted to £6,694.

BROKEN HILL PROPRIETARY BLOCK 14.—The report for the half-year to March 31 last, submitted at the meeting held in Melbourne on May 22, states that the directors regret it has not been found possible to resume productive operations during the half-year. The award, which was referred to in the last half-yearly report, is still in existence, and unless this is revised there is little hope of the mine being reopened in the near future. The report on conditions underground of the Technical Health Commission will, it is hoped, be issued in the course of a few weeks, and possibly a revision of the award may result which will enable the company to reopen the mine and enter upon production again. The total loss for the half-year is £3,966, made up as follows: Working loss, £3,178; depreciation, £781; other charges, £7—£3,966, from which is deducted sundry receipts, £35, leaving net loss £3,931, carried to debit of profit and loss account. The balance at credit of profit and loss account, after deducting net loss of £3,931 already shown, is £18,263. Mine and plant are kept in good order, so that there will be no loss of time should circumstances permit of a renewal of operations.

BRITISH OXYGEN CO., LTD.—The accounts for the year to March 31 last show a profit of £76,849, after providing for corporation profits tax and income tax. The results permit of a final dividend, free of tax, at the rate of 1s. 4d. per share, making 10 per cent., free of tax. The general reserve has been reduced by writing off £28,134, including discount on and cost of issue of 8 per cent. debenture stock, £24,541, less £18,755 at credit of 6 per cent. debenture redemption account, leaving general reserve at £124,621. The directors consider that adequate provision has been made for excess profits duty, corporation tax and income tax in the balance of £138,962 remaining to be carried forward. They consider it advisable to write down the value of the company's holding in Sparklets, Ltd., to the par value on shares in the company which were issued to the shareholders of Sparklets, Ltd., and General Manufacturing Co., Ltd., under the agreement of October 20, 1920, and have therefore written off the premium of 30s. per share upon shares in the company which were issued in connection with that offer and appeared in the last balance sheet in the item of premium account.

Tariff Changes

INDIA.—Revised Tariff valuations on which import duties will be levied on the importation of sulphur into India are as follows:—Sulphur (brimstone) flowers, 8 rs. 8 a. per cent.; roll, 10 rs. 8 a. per cwt.; rough, 7 rs. per cwt. Each item is subject to an import duty of 15 per cent. *ad valorem*.

SIERRA LEONE.—In connection with the intended abolition of the differential export duty on palm kernels exported from the British West African Colonies it is reported that the Ordinance imposing the differential export duty in Sierra Leone was repealed on July 12.

SOUTH AFRICA.—Amendments, etc., to the new Bill amending the Customs Tariff were published in the *Board of Trade Journal* of July 27 (p. 106). In addition to borax, boracic acid, bromine, litharge and manganese dioxide, the following are also made free of duty:—Quicksilver, assay mabor, assayer's bone ashes, agar-agar and peptone. Rebates are allowed on certain imports, including solvent naphtha.

BULGARIA.—The surcharge levied when Customs duties are paid in paper currency has been increased to 1,400 per cent.

GERMANY.—The surtax leviable when the "gold" duties of the Customs Tariff are paid in paper currency is increased to 10,400 per cent. for the period July 26 to August 1 inclusive.

Contracts Open

SOUTH HOLLAND.—100,000 kilograms (about) Chile saltpetre, 15½ per cent., to be delivered from February 15–20, 1923. Particulars from Mr. M. van Zoest, "Landbouwvereeniging Ons Belang," Oude Tonge, South Holland.

AMSTERDAM (August 9).—Chemicals (delivery October); yellow soap (delivery November). Particulars from Inquiry Room, Department of Overseas Trade, 35, Old Queen Street, London. (Ref. No. 16376/F.W./G.P.)

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

London Gazette

Company Winding Up

BRITANNIA FERTILISER CO., LTD. Winding up order, July 25.

Notice of Intended Dividend

HALL, Howard Ephraim, 41, George Street, Luton, under the style of HALL AND SON, chemist and druggist. Last day for receiving proofs, August 14. Trustee, T. Keens, 11, George Street West, Luton.

Notice of Dividend

TOWNSEND, Benjamin John, and JOHNSON, Bernard Charles, trading as the TRENT SOAP AND CHEMICAL CO., Bank Square, Burton-on-Trent, chemical manufacturers. Amount per £, 9d. First and final. Payable, August 11, 18, Low Pavement, Nottingham.

Edinburgh Gazette

DICKSON (R. B.) AND CO. (Robert Brown Dickson), chemists, 745, Great Eastern Road, Parkhead, Glasgow. Estates sequestrated, July 26. Meeting to elect trustee and commissioners, Monday, August 7, at 12 noon, Faculty Hall, St. George's Place, Glasgow.

New Companies Registered

WELLS (BRADFORD), LTD., Frederick Street, Wakefield Road, Bradford. Manufacturers of and dealers in polishing powders, pastes, creams, etc. Nominal capital, £1,000 in £1 shares.

COLUMBUS INVESTMENT TRUST, LTD., The Gables, Banstead, Surrey. To hold securities of Alexander Cross and Sons, Ltd., and the Cross Chemical Co., Ltd., etc. Nominal capital, £32,500 in 10s. shares (20,000 10 per cent. non-cumulative preference, 43,000 ordinary and 2,000 founders).

BISHOPS, LTD., 22, Cooper Street, Manchester. Importers, manufacturers of and dealers in chemical and other preparations, cements, oils, paints, perfumery, soaps, etc. Nominal capital, £1,000 in £1 shares.

BRITISH ORION OIL CO., LTD. Oil refiners, chemical manufacturers, etc., and to enter into an agreement with the Phœnix Oil and Transport Co., Ltd., etc. Nominal capital, £400,000 in 395,000 shares of £1 each and 100,000 shares of 1s. each. A director: J. Norton Griffiths, M.P., 3, Central Buildings, Westminster, London.

AMALGAMATED BOLIDES CO., LTD., 35, Charles Street, Hatton Garden, London. Manufacturers of chemicals, manures, dyes, etc. Nominal capital, £100 in £1 shares.

BETTESHANGER HOLDING CO., LTD., 6A, Bedford Square, London. Chemical manufacturers, etc. Nominal capital. £4,000 7s. in 80,007 shares of 1s. each.

BRITISH MALAYAN PETROLEUM CO., LTD.—Producers, sellers, etc., of petroleum and other oils and products thereof. Nominal capital, £100,000 in £1 shares. A subscriber: A. E. Bruce, 27, Dudley Road, Ilford, Essex.

CARR'S INKS, LTD., Brunswick Park Road, New Southgate, London. Manufacturers of and dealers in inks, adhesives, etc. Nominal capital, £5,000 in £1 shares (4,500 5 per cent. non-cumulative participating preference).

HERBERT GREEN AND CO., LTD., 83, Pall Mall, London. Manufacturers, importers and exporters of and dealers in alcohol, ether, methylated spirit, fusel oil, carbon dioxide, dyes, yeast, soaps, flavouring materials, etc. Nominal capital, £256,250 in 250,000 ordinary shares of £1 each and 125,000 deferred shares of 1s. each.

PERFORATED FUEL SYNDICATE, LTD., 12, Broadway, Westminster, London. To acquire and exploit patents for inventions in relation to perforated ovoids and smokeless fuels, etc. Nominal capital, £1,500 in £1 shares.

RITAGEN, LTD. Chemical manufacturers, etc. Nominal capital, £500 in £1 shares. A director: J. F. Goddard, 59, Tytherton Road, London, N.19.

SHIP CANAL PORTLAND CEMENT SELLING AGENCY, LTD., The Cement Works, Ellesmere Port, Cheshire. Buyers and sellers of and dealers in cement, carbonate of lime, "Carbolimo," etc. Nominal capital, £1,000 in £1 shares.

VINCETT AND CO., LTD., 4, King's Parade, Okehampton Road, Willesden, London. Manufacturers of and dealers in drugs, etc. Nominal capital, £1,500 in £1 shares.

Treatment of Zinc Ores

SPEAKING at the annual meeting of the Rhodesia Broken Hill Development Co., Ltd., held on July 27, the chairman (Mr. E. Davis) said the production of zinc had received great attention. Not only were they carrying out experiments on the property, but they were also having researches made in this country and had some of their ore treated at works in Belgium. They were now looking into the question of the treatment of zinc ores in Africa, and in this connection had begun negotiations with the Rhodesia railways in relation to railway rates on zinc ores to the Victoria Falls, as it might be desirable to harness power at that spot, though they were at the same time looking into the possibility of obtaining water power at no great distance from their property. When they had this information they would be able to decide whether zinc could be produced in Northern Rhodesia on a profitable basis, but to do this capital expenditure would have to be kept down, and therefore it would not only be necessary for the Rhodesian Railway Administration to meet them over the question of transport of plant to the site, but also on the carriage of the zinc production to the coast.

Boot Polish Manufacturers' Failure

THE first meeting of the creditors of the Ineson Gibbs Oil and Chemical Co., Ltd., Marshall Works, Milner Road, Selly Park, Birmingham, was held on July 27 at the Official Receiver's office, Ruskin Chambers, 191, Corporation Street, Birmingham. The statement of affairs showed that the assets were estimated to realise £100, and the deficiency as regarded the creditors was £549 18s. 5d., and as regarded the shareholders, £1,804 18s. 5d. The Official Receiver reported that the company was registered on August 16, 1919, as a private company, with a nominal capital of £3,000, divided into 1,500 preference shares of £1 each and 1,500 ordinary shares of £1 each. The issued capital consisted of 1,080 ordinary shares and 175 preference shares; 405 shares were issued for cash, and 850 were allotted as fully paid to the vendors. The company was promoted by Mr. Alfred Ineson and Mr. Henry Albert Gibbs, who had carried on business as manufacturers of boot and shoe polish, and was formed for the purpose of acquiring and carrying on that business. No records of the company's trading had been kept. The company appeared to have ceased business in December, 1921. The managing director attributed the present position to bad trade, insufficient capital, and depreciation of stock, machinery and plant. The matter was left in the hands of the Official Receiver as trustee.

German Metal Powders

THE Board of Trade Committee appointed under Part II. of the Safeguarding of Industries Act, have investigated a complaint by Metal Powders, Ltd., as to the alleged dumping of German metal powders, and have reported as follows:—(a) We are of opinion that German bronze and aluminium powders are being sold or offered for sale in the United Kingdom at prices with which, when the heavy discounts given by the Germans are taken into account, Metal Powders, Ltd., cannot profitably compete, and that by reason thereof unemployment in the British industry is consequent though, as the industry in this country is in its infancy, it does not support a large number of people. Therefore, we would not describe the unemployment so produced as serious. (b) We think that the imposition of a duty under Part II. of the Act, on bronze and aluminium powders imported from Germany might produce a little unemployment in industries using these articles as material, but we have no reason to think that the unemployment so produced would be serious. (c) We think that Metal Powders, Ltd., are carrying on their work with reasonable efficiency and economy, and that in view of the fact that they are a new concern working at new processes, they have made excellent progress.